Operator Licensing Program Feedback

ES-201
Initial licensing examination process; examination security

1. What is the time expectation for turnaround of an examination submitted for review?

Per Section C.3.e of ES-201 (NUREG-1021), chief examiners are expected to complete their review of the examination outlines within 5 working days. Section C.3.f goes on to say that the sampling review of the written exam (which is discussed in Section E of ES-401) should be completed within one week after receiving the exam and the entire review should be done within two weeks. Facility licensees are encouraged to discuss their specific schedule requirements and expectations with their chief examiner.

2. Is the request for NRC to write the examination required in writing?

Yes. Section 55.40(c) of the amended rule states that the Commission shall prepare the examination upon written request from the power reactor facility licensee pursuant to Section 55.31(a)(3). It has to be a corporate decision with a formal request in writing signed by an authorized facility representative. As stated in Section C.1.a of ES-201, a written response to the NRC's annual letter soliciting examination schedule information (e.g., RIS 2003-14) will satisfy this requirement.

3. Can the utility write part of the examination and the NRC write the other part of the examination? How do you work the "split exam" concept? How can you maintain NRC examiner proficiency if developing "split exams?"

Yes. Allowing the facility licensee and its NRC Regional Office to split responsibility for exam development provides both parties with greater flexibility in scheduling their resources. For example, the Regional Office might be able to support an examination on a specific date if it only has to prepare the written exam or the operating test, but not both.

The desire to split an exam should be reflected in the facility licensee's response to the NRC's annual letter soliciting examination schedule information (e.g., RIS 2003-14) and coordinated with the appropriate NRC Regional Office.

Keep in mind that each Regional Office is still required to prepare one complete examination per year to maintain examiner proficiency, but it can do the written portion of one examination and the operating test on another.

4. The utilities should NOT be the ones to develop the sample plan. This should be developed by the NRC for all examinations administered in the region.

Comment noted. Some facility licensees may prefer to develop their own sample plan. Facility licensees can make arrangements to split responsibility for developing various parts of the examination with the NRC Regional Office. This approach should be reflected in the facility licensee's response to the NRC's annual letter soliciting examination schedule information (e.g., RIS 2003-14) and coordinated with the appropriate NRC Regional Office.

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5. Would you comment on the following proposal? Have a "team" from the utility come to the region and work directly with the chief examiner to develop the written exam. I would propose that a team of experienced utility instructors could bring the exam bank and associated reference material and they, with the chief, could produce the written exam in less than 400 hours. Benefits - lower man hours cost, reduced security concerns (less time on site), fewer negative exam report comments.

The NRC currently does not believe that this is a viable option because it raises concerns regarding independence, accountability for the quality of the final product, and possible adverse public perception.

6. A question has come up on the issue of using the same utility examiners to write the initial exam and the audit exam. What are the requirements for this? If you use independent groups to develop an audit examination and an NRC examination, do you have to worry about overlap? Why?

As stated in Section D.2.b of ES-201 (NUREG-1021), individuals who are on the security agreement may prepare the audit examination, but the examination would be subject to review by the NRC for test item duplication (none is allowed unless the examinations are independently developed).

Note that ES-401 has eliminated the limits on written examination overlap based on the random selection of specific K/A statements and strict adherence to the intent of the selected statements. However, the facility licensee still has to take measures to ensure that the final audit or screening examination and any quizzes that are given after beginning work on the licensing exam do not compromise the integrity of the licensing exam. Section C.1.f of ES-401 provides examples of acceptable control measures, which include the use of independent teams to develop the examinations.

7. Should the utility NRC exam writer be "certified" by the NRC?

No. Although the NRC has considered that and other ways to improve the training and qualifications of utility examination authors, there are no current plans to implement such a program.

8. If the NRC writes the outline, does the facility licensee have to track the question history if the facility licensee writes the examination?

NUREG-1021 eliminated the limits on written question repetition from quizzes given during the training program, thereby eliminating the need to track question histories. However, as stated in Section C.1.h of ES-201, facility licensees are encouraged to identify those questions that were used on an NRC license examination at the facility since October 1995 because they will generally undergo less rigorous review by the NRC.

9. Does "independent review" by a supervisor include question-by-question approval/comment?

Yes. The independent managerial or supervisory reviewer is confirming and signing that the written examinations and operating tests meet the requirements of NUREG-1021. The extent of the review will typically be a function of the experience of the examination author and the quality of facility's examination bank.

10. If a reactor operator is testing for an upgrade and his/her physical is current, does he/she have to have another physical?

No. In accordance with Section D.1.c of ES-204, the medical examination documented on NRC Form 396 is good for two years from the date of the medical examination. Per 10 CFR 55.25, facility licensees are required to notify the NRC within 30 days of learning that a licensed operator has developed a permanent physical or mental condition that causes the operator to fail to meet the eligibility requirements.

11. Why does the NRC not have to sign a security agreement?

The primary purpose of the security agreement is to prevent inadvertent compromises by ensuring that the people having knowledge of the examination content are aware of their responsibilities. NRC examiners are aware of their responsibilities with regard to examination security and rarely find themselves in a position where they could inadvertently compromise the examination. They are only on-site to validate and administer the examinations and they do not routinely interact with the license applicants.

12. ES-201, Section D.2.b, Bullet #2, prohibits someone on the exam security agreement from doing on-the-job training (OJT), practice, coaching, and sign-offs. Does this prohibit an operator (on exam security) who is standing a regularly scheduled shift from signing off a trainee scheduled to stand that shift under instruction in the position? This is not referring to signing of individual OJT tasks, just the shift itself. (We currently do not permit this, I just want to be clear on the requirements of the examination standard).

When the operator comes out to validate the written, can they have OJT contact with an applicant after the operator is on the security agreement?

Section D.2.b of ES-201 prohibits all OJT activities. A license applicant should not be standing watches under instruction with, or receive OJT sign-offs from, a licensed operator who has knowledge of the examination content.

13. Why does ES-201, Section D.2.b, Bullet #1, permit a person signed onto the initial exam security agreement to operate the simulator from the booth when this is not permitted in ES-601 for requal? Why the inconsistency?

This inconsistency, which resulted from an oversight during the development of Revision 8 of NUREG-1021, has been corrected. The security restrictions on Form ES-601-1 are now the same as in ES-201.

14. Why do the standards not allow the utility to give the same JPMs and scenarios the following day if the applicants sign a confidentiality agreement? If an individual examinee is on security agreement, can you then reuse a JPM set?

The NRC takes examination security very seriously, and prohibiting the reuse of test materials is the most effective way to minimize the risk of compromising an examination. No.

15. Although some relaxation was included in final Revision 8 of NUREG-1021, it is still much too restrictive (in my opinion). Why is it that an instructor cannot teach once he has knowledge of the exam? This requirement causes me to need additional staffing because once he has knowledge of sample plan, he is not available. Why can't we use the instructor, and rely on his integrity (via signature, under penalty of law, etc.)?

What is it going to take to use the instructor in both the exam development process and in candidate instruction/supervision?

While developing the current examination process, the NRC identified a number of vulnerabilities (including independence and public perception, examination security and integrity) associated with allowing facility licensees to prepare the initial licensing examinations, which had, theretofore, been prepared exclusively by NRC examiners or contractors. To the extent possible, the NRC established guidelines and criteria in ES-201 of NUREG-1021, including the personnel and security restrictions, to mitigate the vulnerabilities. Please refer to SECY-96-206 (the rulemaking plan) and SECY-98-266 (the final rule) for a discussion of the NRC's rationale. It should be noted that the current restrictions are consistent with the change recommended by the Nuclear Energy Institute (NEI) during the rulemaking process.

Although ES-201 clarifies that supervisors can counsel applicants regarding non-technical issues, direct training activities are still prohibited. There is some flexibility to address unique situations on a case-by-case basis; however, a generic change in policy is unlikely unless the industry can adequately address the NRC's concerns regarding public perception and confidence.

16. Providing individual applicant feedback is a prohibited activity for individuals on the security agreement. How does this apply to Manager/Supervisor situations such as sitting on a performance review committee or coaching/counseling associated with a non-technical situation (e.g. classroom behavior)?

Managers/supervisors on the security agreement may continue to counsel the applicants concerning non-technical issues. However, as stated in Section D.2.b of ES-201, they are not

allowed to provide any technical guidance, training, or any other direct feedback that may compromise examination integrity as defined in 10 CFR 55.49.

17. Is a facility required to check with a contractor to determine if they are concurrently developing a similar exam for another utility? If so, do these exams need to be given on the same day? Also, what other security requirements need to be met?

If you have a common group develop examinations for two different plants, do you have to worry about overlap between these exams? What are the criteria?

Pursuant to 10 CFR 55.40(b)(2), facility licensees that prepare their own examinations are expected to take reasonable measures to control examination security and integrity. As noted in Section C.1.d of ES-201, facility licensees may use contractors or other outside assistance to develop the examinations, but the licensees bear full responsibility for the product, including conformance with the examination criteria and maintenance of examination security and integrity. Additionally, Section C.1.h of ES-201 (in NUREG-1021) discusses the requirements for controlling and documenting the source of test items and the predictability of the examination content. Licensees should obtain this information from their examination contractor if one is used. If there is a basis for the applicants to predict the content of the examination and the overlap with the other utility's examination is significant, then the utility must evaluate the issue, determine if compensatory measures are appropriate, and discuss the issue with the NRC as early as possible. Factors to consider would include the timing between the exams and the physical and corporate distance between the facilities. For example, this evaluation could reasonably differ if, in one case, the sites are owned by the same utility, located 20 miles apart, and the exams are separated by a month, versus another case in which the exams are 8 months and 2000 miles apart.

18. As part of normal instructor duty, 10 questions were submitted to an examination team. Does the instructor have any examination information?

As long as the instructor is not aware if any of the questions meet the sample plan and the questions are placed in the exam bank, then the instructor would not be considered to have exam information. However, if the questions are given to the examination team with the expectation that they will be used as new questions, then the instructor should be on the security agreement. Specific questions regarding this issue should be discussed with the NRC.

19. If involved in an initial examination, is there a restriction from teaching requal?

An initial licensed operator upgrade candidate attends licensed operator requalification training with his crew. The instructor is on the initial NRC exam team and has signed the exam security documents. Is the initial NRC exam candidate allowed to remain in the class/simulator or must he/she leave?

Use of instructors is still an issue. The use of an instructor, who is on the exam security agreement, can't teach candidates attending the requalification program. This is an unnecessary burden on resource restrictions.

SRO upgrade applicants who are removed from the watch rotation do not have to attend RO requalification training while they are training for the SRO license. If there are no upgrade applicants in the requalification class, there would be no restriction on the instructors. However, as stated in Section D.2.b of ES-201 (NUREG-1021), if SRO upgrade applicants are present in the class, instructors would not be permitted to teach in areas in which they have examination knowledge, and their activities would have to be documented on Form ES-201-3. They can teach subjects about which they have no examination knowledge, which is a good reason to limit everyone's access to only those portions of the exam for which they have responsibility. Instructors with examination knowledge should not be used in training environments that require one-on-one contact with trainees. There is no problem with them teaching a requalification lecture or simulator session, but the trainer with examination knowledge must avoid direct individual interaction with the applicants.

20. Is it acceptable to password protect exam files and leave them on a local area network (LAN) or password protect them on a hard drive? (The concern is that floppy disks are more susceptible to damage).

Yes. As stated in Attachment 1 of ES-201, the use of passwords should provide adequate security if normal computer security practices (e.g., selecting and changing passwords) are observed. Special cases may need additional consideration. For example, if a trainee has extended access to the LAN in his normal position, additional security measures might be appropriate.

21. Will you allow transfer of electronic files of exam materials over the Internet via e-mail if the file is "password protected?"

As stated in Attachment 1 of ES-201, examinations shall not be transmitted via non-secure electronic means. Licensees may transmit the exams via the NRC's "AUTOS" local area network by making arrangements with the NRC resident inspector at the facility. Licensees may also transmit password-protected electronic files over the Internet if the licensee's word processing software provides adequate security and is compatible with the NRC's and the password is separately provided to the NRC chief examiner by mail or phone. The files do not need to be encrypted.

22. If the examination is password protected, how much hacking do we have to protect against?

Pursuant to 10 CFR 55.49, the NRC expects facility licensees to take reasonable measures to prevent inadvertent examination compromises. Attachment 1 of ES-201 describes a number of examination security guidelines that facility licensees may consider. The NRC does expect reasonable computer security measures to be in place, but it does not expect facility licensees to defend their examinations against willful acts, such as computer hacking.

23. The person who issues the password and knows what it is for a computer system - is he in possession of examination material?

Although the people who issue computer passwords may not have possession of examination material, they probably have access to that material and any other sensitive or classified information stored on that computer system. These individuals should be aware of their authority and responsibility with regard to accessing and safeguarding sensitive information. There would certainly be no harm in having them sign the examination security form.

24. What are the time frames when security restrictions begin?

The security restrictions begin whenever someone makes the first decision regarding the topics to be tested on any part of the licensing examination.

25. When does someone have to go on examination security?

Per Section D.2.b of ES-201, they must acknowledge their security responsibilities by reading and signing the security agreement (Form ES-201-3) before they obtain detailed knowledge of any part of the examination.

26. If an applicant fails a section of a licensing examination that was developed using one revision of NUREG-1021 and applies for a partial retake examination after the next revision of the NUREG has been issued, what version of the NUREG will be used to prepare the retake examination?

The decision would be based on maintaining continuity in examination content and format. If there is essentially no change in the content and format of the exam between the two revisions of NUREG-1021, it makes no difference which version is used, and it generally makes more sense to use the current version, especially if other applicants will be taking the entire examination. However, if the format or content of the exam has changed substantially (as it did when the prescripted JPM questions were deleted in Revision 8) it might make sense to administer the exam using the older format (e.g., if missed prescripted questions contributed to the failure). In summary, the NRC would default to the new standard, unless there is a logical basis to stick with the previous version.

27. Is there a "hard-limit" to the number of people that can sign in on a security agreement?

No. Section D.2.a of ES-201 of NUREG-1021 outlines the expectations in this regard.

28. If an exam compromise is suspected, are the examiners expected to leave the site?

No. In accordance with Section C.3.b of ES-201, examiners must immediately report any perceived compromise to the responsible regional supervisor so that the necessary actions can be taken to restore the integrity of the examination. Per section C.2.k, those actions might include not giving the exam, making additional changes to the exam, voiding the results if the exam has already been given, reevaluating the licensing decisions pursuant to 10 CFR

55.61(b), and possibly the imposition of enforcement action. It is much easier to determine the most appropriate action if the examiners remain on-site to assess the situation. The final course of action would be determined in collaboration with regional management and the NRR operator licensing program office.

29. Why doesn't the NRC have additional staff to support emergent utility exam needs? Writing of exams is not voluntary because of resource restraints. What is the NRC doing about it?

The NRC staff does budget some additional resources for retake examinations, but the NRC's Congressional budget allocation does not permit us to maintain a dedicated corps of examiners capable of handling every conceivable peak work load. That is why it is sometimes necessary for licensees to develop their own examinations (which require fewer NRC resources) or to shift their examinations (usually no more than a few weeks) to a time when NRC resources are available. The NRC does have a limited pool of former examiners to draw upon in response to utility examination needs. However, those individuals' primary responsibilities in their current positions generally have priority so they are not always available on short notice. The operator licensing program office is currently working with the regions in an effort to share resources, when possible, to satisfy regional peaks in examination demand.

30. If a utility does not have enough staff to write an ILO [initial licensed operator] exam, is it better to have a vendor or the NRC write the exam?

This is a decision that facility management will have to make based upon cost, resource availability, scheduling flexibility, and other factors. The chances of getting an exam at a specific time are best if the licensee (or its vendor) prepares it.

31. What are the final Rev. 8 [of NUREG-1021] and supplemental security relaxation benefits?

Final Revision 8 of NUREG-1021 removed all restrictions on who can write the initial operator licensing examinations. However, the NUREG still requires anyone who has knowledge of the examination contents to sign a security agreement and refrain from most training-related activities involving the license applicants. Refer to Section D.2 of ES-201 for the details.

Additional changes in Supplement 1 further clarified the types of training-related activities that managers and supervisors can perform once they have knowledge of the examination contents.

32. Why does anyone feel that we got what we asked for when Virginia Power requested that utilities be able to write and administer the exams?

Because the August 30, 1994, letter from Virginia Power made five process recommendations, including NRC administration of the operating tests and written examinations, all of which have been adopted in the revised examination program.

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33. Can the initial license exam author or an exam team member provide difficulty ratings for weekly written quizzes given to an initial license class? There is no contact with the class and no direct feedback. Operations and Training Management use the difficulty ratings to gauge student progress.

The NRC takes examination security and integrity very seriously. However, based on your assertion that the raters would have no contact with the class and no direct feedback and that the difficulty ratings would only be used to gauge student progress, there should be no problem with your proposal.

34. Is it acceptable for a dedicated, locked examination security room to have a ceiling with removable tiles or does it need to have a hardened ceiling to be considered sufficient for exam security purposes?

The NRC expects facility licensees to take reasonable measures to prevent inadvertent examination compromises. Attachment 1 of ES-201 of NUREG-1021 describes a number of examination security guidelines that facility licensees may consider, but it does not address the need for hardened examination development facilities. If the examinations are prepared in a hardened room with no drop ceiling and a decent lock on the door, then the authors could probably leave the exams lying about the room without much worry. However, if the exam room has a drop ceiling that someone could easily crawl over, then the authors should probably consider locking the exam materials in a file cabinet when the room is going to be unoccupied for a considerable period of time (e.g., nights and weekends) and there is a possibility that someone could crawl over the wall undetected (e.g., the exam room is in an isolated part of the building). A room with a locked door would likely provide sufficient protection for an exam left on the desk while the author goes to the rest room, even if the ceiling contains removable tiles. Licensees need to exercise common sense and decide for themselves how much they want to spend to maintain examination security and how much risk and expense they can tolerate if an exam is compromised.

Operator Licensing Program Feedback

ES-202
How to apply for a new license; eligibility; training; experience; reactivity manipulations; medicals

1. Significant reactivity manipulations were defined in the Q&A portion of NUREG-1262. The information notice issued a couple/three years ago seems to conflict with NUREG-1262. An answer to what is a significant manipulation should support NUREG-1262.

Reactivity manipulations for [initial licensed operator] ILO training: What is the status of allowing simulator manipulations (when unable to perform in-plant)? Also, define what constitutes a control manipulation. Why is a rod operability surveillance ok at one plant but not another? What constitutes a large change?

What is acceptable for reactivity manipulations? (any real-life examples of problems or rejected applications)

What are the criteria for doing reactivity manipulations on the simulator?

Information Notice 97-67, "Failure to Satisfy Requirements for Significant Manipulations of the Controls for Power Reactor Operator Licensing," restated and clarified the NRC's position on this issue. The staff does not believe that the IN contradicts the guidance in NUREG-1262.

Effective on November 16, 2001, 10 CFR 55.31(a)(5) was revised to allow the use of plant-referenced simulators to conduct the required control manipulations. Facility licensees that propose to use a plant-referenced simulator to perform the control manipulations must ensure that simulator fidelity has been demonstrated pursuant to 10 CFR 55.46(c).

The same test (e.g., started at a comparable power level, including a comparable number of rods, and a comparable reactivity change) should be acceptable on either plant. Without specifics, it is not possible to speculate why one was acceptable and the other was not.

10 CFR 55.31(a)(5) requires five "significant" control manipulations, and 10 CFR 55.59(c)(3)(i) provides a number of examples (which are not requirements). Per Example F, and as noted in IN 97-67, a power change of at least 10% is an example of a significant (or large) control manipulation. It would also be acceptable, when defining allowed reactivity manipulations, to evaluate the knowledge and abilities exercised in a controlled large evolution and then accept all smaller tasks that comparably exercise the same knowledge and abilities. The NRC expects such evaluations to be formally documented as part of the licensee's SAT-based (systematic approach to training) program.

The criteria for doing the 10 CFR 55.31(a)(5) reactivity manipulations on the simulator are discussed in SECY-99-225, the staff paper that forwarded the associated rulemaking plan to the Commission for approval and SECY-00-0083, the proposed rulemaking paper, which was issued on April 12, 2000. Facility licensees that propose to use a plant-referenced simulator to perform the control manipulations required by 10 CFR 55.31(a)(5) must ensure that simulator

fidelity has been demonstrated pursuant to 10 CFR 55.46(c). Control manipulations performed on the plant-referenced simulator may be chosen from a representative sampling of the control manipulations and plant evolutions described in 10 CFR 55.59(c)(3)(i)(A-F), (R), (T), (W), and (X), as applicable to the design of the plant for which the license application is submitted. As discussed in Section C.1.c of ES-202 (NUREG-1021) power changes that are performed on the simulator must be 10% or greater in magnitude, while those on the plant may be smaller (to limit unnecessary transients on the facility) but of sufficient magnitude for the operator to experience appropriate feedback (i.e., clearly observable effects on the plant) as a result of the control manipulation.

2. Can a candidate enrolled in a reactor operator initial license training program receive credit for significant control (reactivity) manipulations performed in the control room as the Balance of Plant (BOP) operator? For example, can the following manipulation, 10 CFR 55.59(c)(i)(C), be performed as BOP? Manual control of steam generators or feedwater or both during startup and shutdown.

A related question is: Do Direct SRO candidates (i.e., instant SROs) have to perform the manipulations as ROs to get credit, or can they supervise them as SROs (i.e., procedure readers) to get credit?

10 CFR 55.31(a)(5) requires that an applicant provide evidence that the applicant, as a trainee, has successfully manipulated the controls of either the facility for which a license is sought or a plant-referenced simulator that meets the requirements of 55.46(c). At a minimum, five significant control manipulations must be performed that affect reactivity or power level. Control manipulations performed on the plant-referenced simulator may be chosen from a representative sampling of the control manipulations and plant evolutions described in 10 CFR 55.59(c)(3)(i)(A-F),(R),(T),(W), and (X) of this part, as applicable to the design of the plant for which the license application is submitted.

Therefore, two criteria drive the requirements for the five control manipulations, they must be significant and must affect reactivity or power level. "Manual control of steam generators or feedwater or both during startup and shutdown" is only sufficient to meet those two criteria if the licensee can clearly show that the manual control was significant and noticeably affected reactivity or power level. There is no requirement for the control manipulations to be completed in the RO watch position, so any manipulation done in the BOP watch station would qualify as long as it meets the requirements discussed above.

With regard to direct, or instant, SRO applicants, the control manipulations must be done in either the RO or BOP positions (i.e., hands-on); supervising another operator performing the manipulations would not be acceptable.

Keep in mind, as noted in Revision 2 of Regulatory Guide 1.8, "Qualification and Training of Personnel for Nuclear Power Plants," that every effort should be made to have a diversity of reactivity changes for each applicant. Moreover, in keeping with the definition of "Controls" in 10 CFR 55.4, it is preferable that the required manipulations focus on those apparatus and mechanisms that directly affect the reactivity or power level of the reactor (e.g., control rods, boration/dilution, and turbine load for a PWR; control rods and recirculation flow for a BWR).

After all, in accordance with 10 CFR 50.54(i), those are the only apparatus and mechanisms (i.e., controls) that can be manipulated exclusively by operators and senior operators licensed (or in training for a license) pursuant to 10 CFR 55.

3. Does maintaining power constant at 1-2% and diluting 1000 pcm due to xenon over a shift count as a reactivity manipulation?

Yes. Although this example does not precisely fit any of the items in 10 CFR 55.59(c)(3)(i), it would be acceptable to count as one of the five required reactivity manipulations. As noted in Regulatory Guide 1.8, Revision 2, every effort should be made to have a diversity of reactivity changes for each applicant. See the previous question for more information.

4. Can a reactor startup below the point of adding heat constitute a manipulation?

What constitutes "significant?"

What is the current position on diversity; e.g., can 5 power changes using boration be used?

Yes.

As indicated in Information Notice 97-67, "Failure to Satisfy Requirements for Significant Manipulations of the Controls for Power Reactor Operator Licensing," and defined in 10 CFR 55.59(c)(3)(i)(E), a 10 percent or greater power change is an example of a significant control manipulation.

As stated in the IN and Regulatory Guide 1.8, Revision 2, diversity of control manipulations is expected but not required. Similarly, if the training program is developed using a systematic approach, it would seem inappropriate to conduct the same control manipulation five times. Some diversity is better than none; i.e., the 5 boration power changes should be as diverse as possible. See the previous two questions for more information.

5. Does the 1-year waiver clock start at the time the denial is received from the NRC following the exam or does it start after all appeals have been resolved?

As stated in Section D.1.a of ES-204 (NUREG-1021), the 1-year waiver clock starts on the date when the original examination was completed.

6. We believe an applicant meets the eligibility requirements, but ask the NRC to evaluate this to make sure - is this a waiver request?

No. It would not constitute a waiver request until you submit a license application (NRC Form-398) that specifically requests a waiver of the eligibility guideline or requirement.

Operator Licensing Program Feedback

7. If a utility is preparing an examination per NUREG-1021, is it required to comply with ES-202, Section D (license eligibility requirements), which is based on Regulatory Guide 1.8?

When verifying entry level prerequisites for a candidate, do I have to validate them to the requirements stated in ES-202? If not, to which standard must the candidate be validated against? If I have a SAT [systematic approach to training] based program, why is the NRC concerned about entry level verification? This renewed interest appears to contradict the information in NUREG-1262.

No. Participation in the examination development does not affect the facility licensee's prior commitments regarding license eligibility (i.e., experience, education, and training). As always, the NRC expects facility licensees to comply with their commitments; if a licensee has made conflicting or contradictory commitments, it would generally be held to the more conservative or restrictive obligation.

Refer to Regulatory Issue Summary (RIS) 2001-01, "Eligibility of Operator License Applicants," for a discussion of this issue. Also note that, in May 2000, the NRC issued Revision 3 of Regulatory Guide 1.8, which endorses ANSI/ANS-3.1-1993, and that ES-202 has been updated to reflect this change.

8. Can self-study hours be counted on the application as part of the required 500 training hours?

As a general rule, self-study time should NOT be used as a substitute for classroom instruction time that is specified in a facility licensee's approved (i.e., accredited) training program and licensing basis. However, if the licensee's program includes provisions for waivers and equivalence determinations, it may be appropriate to customize an individual's training based on prior instruction and experience. Such a program might include independent study with specific learning objectives and follow-up testing to ensure that the learning objectives have been mastered.

9. What are experience requirements for SRO/RO?

In accordance with 10 CFR 55.31(a)(4), an applicant must provide evidence that he or she has successfully completed the facility licensee's requirements to be licensed as an operator or senior operator. The facility licensee's requirements, as embodied in its licensing basis (e.g., its technical specifications, quality assurance plan, and final safety analysis report) and approved training program, should be clearly defined and consistent. Pursuant to SAT-based (systematic approach to training) principles, the NRC expects the facility licensee to formally evaluate and document the applicants' training and experience vis-a-vis its requirements and commitments.

Refer to Regulatory Issue Summary (RIS) 2001-01, "Eligibility of Operator License Applicants," for a detailed discussion of this issue. Also note that, in May 2000, the NRC issued Revision 3 of Regulatory Guide 1.8, which endorses ANSI/ANS-3.1-1993, and that ES-202 has been updated to reflect this change.

10. For a [systematic approach to training] SAT-based program, what and where are the requirements for "responsible power plant" experience?

What are the real requirements if you have SAT- based program?

Refer to Regulatory Issue Summary (RIS) 2001-01, "Eligibility of Operator License Applicants," for a detailed discussion of the NRC's current guidelines regarding the training and qualification of licensed operators. Also note that, in May 2000, the NRC issued Revision 3 of Regulatory Guide 1.8, which endorses ANSI/ANS-3.1-1993, and that ES-202 has been updated to reflect this change.

11. Regarding the 6-months on-site experience requirement:

- ANSI allows 13 weeks on-shift training to count toward the 6 months
- ANSI allows simulator training to count (simulator training is usually 3 or more months)

Can training program provide the 6-months of on-site experience?

What is "responsible power plant experience?" Need a definition that is broader than staff engineer and operator? For example, operations instructor, ex-NRC examiner, and maintenance supervisor.

"Responsible" power plant experience - This issue needs to be resolved; INPO, NRC, NEI need to determine the specifics and let us know. We need to know without reservation that SRO-instant candidates meet this ambiguous "experience" requirements prior to them entering a license class.

Responsible Power Plant experience acceptance needs to be explicit. For example, why does an NRC Resident or Water Treatment power plant engineer receive one for one credit while a licensed simulator instructor or plant equipment operator receives no credit?

As noted in Section D of ES-202, the NRC considers training and experience to be separate aspects of license eligibility. Per NUREG-1262 (Question No. 113), a person should meet the experience guidelines before entering the license training program. Time spent in training before entering the license training program may qualify as experience, but time spent in a training program leading up to license application (including the time spent on-shift and in simulator training) should normally not be double-counted as experience.

Refer to Regulatory Issue Summary (RIS) 2001-01, "Eligibility of Operator License Applicants," for a detailed discussion of the NRC's current guidelines for the qualification and training of licensed operators. Also note that, in May 2000, the NRC issued Revision 3 of Regulatory Guide 1.8, which endorses ANSI/ANS-3.1-1993, and that ES-202 has been updated to reflect this change.

As stated in the Executive Summary of NUREG-1021, facility licensees are encouraged to resolve any applicant eligibility questions with their NRC Regional Office before commencing a

license training class. Pursuant to SAT-based (systematic approach to training) principles, the NRC expects facility licensees to formally evaluate and document their applicants' training and experience vis-a-vis the facility's requirements and commitments. As discussed in Section D.2.a(4) of ES-202, the NRR operator licensing program office will assess the eligibility of equipment operators, plant technicians, and non-degreed licensed operator instructors, who do not satisfy the strict definition of RNPPE and might otherwise be disqualified, on a case-by-case basis to determine the amount of credit to be granted.

12. Can a 1 hour reactivity change be counted towards the needed on-shift time? Can a four hour evolution be counted if the applicant attends all prerequisites and post-activities?

Per 10 CFR 55.31(a)(4), license applicants must provide evidence that they have successfully completed the facility licensee's requirements to be licensed as an operator or senior operator. The NRC's regulations and guidance documents do not specify how to count the 3 months of on-shift time. However, if the facility licensee's accredited training program or other commitments (e.g., its final safety analysis report or technical specifications) provide such guidance, then the NRC would expect the facility and applicant to comply. Since the intent of this training is for the applicant to experience the full range of routine, day-to-day shift activities, the NRC would expect, in the absence of a contradictory facility requirement, that the training would be accomplished in full-shift increments.

13. Can the 6-months on-site power plant experience occur prior to a break in service (e.g., the individual works on-site for over 6 months in a responsible position; he/she then leaves the site and returns some time later. Is the 6 months satisfied already?)

Per 10 CFR 55.31(a)(4), license applicants must provide evidence that they have successfully completed the facility licensee's requirements to be licensed as an operator or senior operator. The NRC's regulations and guidance documents do not specify when the 6 months of on-site experience needs to take place. However, if the facility licensee's accredited training program or other commitments (e.g., its final safety analysis report or technical specifications) prohibit a break in service, then the NRC would expect the facility and applicant to comply.

14. Can a facility be committed to ANSI N18.1-1971 for candidate eligibility, yet incorporate guidance of ES-202/RG-1.8 or other document(s) without changing the committed document?

In 1987, Generic Letter 87-07 (which was issued in connection with a revision to 10 CFR 55) gave facility licensees the option of substituting an accredited training program for their initial and requalification training programs previously approved by the NRC. As discussed in response to Question 7 above, most facility licensees elected this option in writing, but some of them neglected to revise the training program descriptions in their technical specifications, final safety analysis reports, and other documents. As a result, some facility licensees have conflicting and contradictory training program commitments and requirements.
Refer to Regulatory Issue Summary (RIS) 2001-01, "Eligibility of Operator License Applicants," for a detailed discussion of the NRC's current guidelines for the qualification and training of licensed operators. Also note that, in May 2000, the NRC issued Revision 3 of Regulatory

Guide 1.8, which endorses ANSI/ANS-3.1-1993, and that ES-202 has been updated to reflect this change.

15. Can a "program" be split as follows: Complete phase 1 which concludes with a GFE; then suspend the program so that the trainees can get 6-months onsite experience; then restart and complete the program and get a license.

Possibly. The NRC does not require the site-specific training to begin immediately after taking the generic fundamentals examination. However, the NRC does expect facility licensees to comply with their licensing basis requirements and commitments regarding licensed operator experience and training. Also, note that, beginning with Revision 9 of NUREG-1021, applicants must satisfactorily complete the GFE within 24 months before the date of license application.

16. Can we eliminate [the] hours of operation on [NRC Form] 398 [for license renewal applications]?

The requirement to supply that information is contained in 10 CFR 55.57(a)(3). The only way it could be eliminated from the form is by amending the regulation or requesting an exemption.

This issue was also raised in connection with a recent extension request for the Office of Management and Budget (OMB) Clearance covering 10 CFR Part 55. The NRC staff is reassessing the need to collect this information and will consider eliminating the requirement the next time it undertakes an administrative revision to 10 CFR 55. In the interim, the staff has revised NRC Form 398 to minimize the record-keeping burden by establishing three broad ranges (i.e., less than 100 hours, between 100 and 1000 hours, and more than 1000 hours) from which renewal applicants can select.

17. For Revision 9 of NUREG-1021, expand the detail requirements for people who had a license at the unit and dropped it longer than 2 years ago. NUREG-1021 covers initial, upgrade and less than 2 years, but not in between.

The regulations (specifically 10 CFR 55.47) allow a waiver of the operating and written test if the applicant had extensive actual operating experience at the facility or a comparable facility within the last two years. After two years the applicant must take the full license examination or request and justify an exemption. The NRC currently has no plans to change this aspect of the regulation.

Operator Licensing Program Feedback

ES-204
Examination and eligibility waivers

No current feedback.

Operator Licensing Program Feedback

ES-205
Generic fundamentals examination (GFE)

1. At what point will the GFE be a computer-based exam including immediate grading? Proctor would be onsite. Could anything be done such that the GFES [Generic Fundamentals Examination Section] is generated (and thus administered) just-in-time?

In light of the increasing size of the GFES question banks, the NRC has changed the bank/modified/new question distribution from 25/20/5 to 40/5/5 (based on a 50-question examination). The NRC may consider allowing facility licensees to develop the 5 modified and 5 new questions (for review and approval by the NRC) if they were unable to participate in one of the regularly scheduled GFES. The NRC is uncertain, at this point, when and if GFES question banks might someday be large enough to justify preparing an examination based entirely on bank questions.

2. What are the opportunities for industry comment on the Generic Fundamentals Examination (GFE)?

In response to an industry request, ES-205 of NUREG-1021 has been revised (refer to Section C.4) to include provisions for one BWR and one PWR instructor to review the GFE before it is administered. The reviewers must be drawn from facilities that will not participate in the scheduled GFE and must sign security agreements. If they do not provide feedback to the NRC staff within the time allotted, the examinations will proceed on schedule. The NRC will evaluate the reviewers' comments and make changes as deemed appropriate.

According to the examination proctor instructions and procedures, each GFE administration is followed by a five-day review and comment period for industry. This period of time allows all utilities participating in any GFE to comment on the examination as a whole and on any of its questions. Additionally, for those utilities that did not participate in a particular GFE, a copy of the exam will be available on the NRC's GFE web site and utility comments are welcome. The NRC reviews and analyzes all utility comments and, based upon their merit, makes adjustments to the answer key before the final grade reports are issued. We believe this process -- that allows industry input -- is a positive one that has worked well over the years. In fact, generally one or two questions per examination do end up with answer key changes (e.g., 2 correct answers or deletion) attributed to utility comments.

In order to minimize the differences of opinion that can occur, the NRC encourages utilities to provide solid technical information and documentation to support their position for any answer key changes. Otherwise, the NRC staff may have insufficient justification to make the desired adjustments. When comments are supported with documentation, we carefully review each comment at two levels: the examination developer level and the NRC staff level. Both levels involve subject-matter-expert analysis of the question and the reference information before any final decision is made.

Operator Licensing Program Feedback

3. What is meant by operational validity and have GFE test items become more difficult by testing plant-specific system knowledge?

In the development process for the GFE, the NRC strives to create questions that are technically, operationally, and psychometrically valid. For example, to achieve operational validity -- a hallmark of good test item writing that seeks to ask questions within the context of the actual job -- we strive to develop questions that assess applicant understanding, use, and application of the safety-significant knowledge that is required for licensing. These types of items assess whether applicants can use and apply the knowledge they learned vice merely recalling the facts. To improve operational validity, GFE questions will often use basic plant terms and situational contexts.

(PLEASE NOTE: The operational validity of a GFE question does not require that the applicant be able to operate the plant. The GFE does not test knowledge of plant-specific system design, general or emergency operating procedures. However, an operationally valid GFE question does assess understanding and application of components, reactor theory, and thermodynamics within a realistic, job-related context. Therefore, applicants are expected to possess some basic understanding of plant systems and plant response.)

The NRC has received occasional comments that selected GFE questions require an inappropriate level of plant systems knowledge. There are many GFE knowledge and abilities (K/As) that directly or indirectly require some basic knowledge of power plant systems. For example, knowledge of the basic function of some plant systems (such as the reactor, reactor coolant system, control rod drive system, main turbine and main generator) is required. Without some assumed basic system knowledge, we would have to limit fundamentals knowledge testing to theoretical facts alone. By assuming some basic plant systems knowledge, we are able to move from theoretical fact testing (i.e., fundamental knowledge) into the real, or physical, domain where our examinations are more operationally valid.

During the GFE review process, the examination author and NRC staff evaluate each question to determine whether inappropriate plant systems knowledge is required. In striving to achieve high operational validity, there is some risk that we will occasionally cross the fine line that separates appropriate (basic) plant systems knowledge from inappropriate (more advanced) plant systems knowledge. On a few occasions, utility post-examination comments have expressed this concern, and the NRC has made changes to the examination answer key prior to issuing final grades. The NRC endeavors to administer licensing examinations that are valid and reliable indicators of the applicants' knowledge and abilities. The most valid operator licensing written examinations (including the GFE) use questions that have valid content, operational relevance, and the ability to discriminate between different levels of applicant knowledge. Therefore, the fundamental knowledge addressed by a K/A will often be tested by requiring the applicant to apply the knowledge in the context of a realistic, or operational, setting.

The fact that a specific word or term is absent from a generic fundamentals K/A statement does not disqualify a related knowledge from being tested on the GFE. K/A statements are often written as general statements of required knowledge. Therefore, GFE questions are not required to contain specific words found in generic fundamentals K/A statements. However,

they are required to preserve the intent of the valid K/A. In summary, the NRC staff endeavors to exercise good judgment and not to go beyond normal GFE training bounds. We welcome feedback from utilities that believe we may have transcended those boundaries and will seek to correct those instances. (Please see ES-401, FAQs #14, 15, 16, and 38 for related discussions).

4. Are there any other statistical factors involved in evaluating GFE questions?

The GFE is a nationally-administered, standardized examination. Since a large number of individuals are evaluated (in comparison to the site-specific examinations), the NRC is able to calculate statistics that provide insight into how the examination performed. After every GFE, we evaluate the overall examination and individual question performance statistics to determine, among other things, if there is a basis to make any changes in the answer key or the questions before they are reused. One statistical indicator of the overall exam is the mean score of the applicants taking the GFE. Typically, the mean scores have been relatively high, hovering in the 88 to 91 percent range. This is indicative of a moderately easy examination for well-trained applicants.

Another statistic evaluated during the post-examination review is the item discrimination ratio (IDR). The IDR is calculated and expressed as a correlation coefficient for each test question. The IDR indicates whether the question discriminated between masters and non-masters, i.e., between high scorers and low scorers. We would expect higher performers overall to answer any given question correctly more often than lower performers overall. Therefore, when the IDR is a positive number, it confirms that the question discriminated as intended.

5. Are there differences in viewpoint on how the validity of GFE questions is determined?

The NRC staff believes that the overall validity of the GFE can be viewed from different perspectives. A utility's view will most certainly be influenced mainly by the learning objectives and content of its fundamentals training program; a GFE that examines only those topics that the utility trained on would be the most valid. The fact that all utility fundamentals training programs are probably not exactly the same suggests that there may be a variety of different viewpoints regarding the validity of GFE questions.

However, the GFE is a nationally-administered, standardized examination whose content validity is determined mainly by the K/A statements listed in the NRC's K/A catalogs, NUREGs-1122 and 1123. From the NRC's perspective, a GFE that maintains clear links to those fundamentals K/As would be most valid. Therefore, the extent to which a utility that has adjusted its fundamentals training program to include learning objectives and content that encompasses all the fundamentals K/As (with 2.5 or greater importance rating) would likely determine the extent to which the utility shares the NRC's perspective on GFE validity. (Please see ES-401, FAQ #12 for a related discussion).

Operator Licensing Program Feedback

ES-301
Preparing operating tests (JPMs and scenarios) for initial licensing examinations

1. One of the recognized factors for test item validity is discrimination of job position, however, the walk-through examination has a significant portion done in the plant, outside the control room. These tasks are non-licensed operator level, thus, fail to discriminate for the job positions of reactor operator or senior operator.

10 CFR 55.45(b)(1) requires the operating test to be administered in a plant walk-through and a simulation facility. Therefore, it would not be possible to eliminate the in-plant portion without first amending the regulation. Reactor operators and senior operators need to be familiar with in-plant operations that they oversee and could conceivably be called upon to perform during emergency situations. Per ES-301 of NUREG-1021, tasks selected for the walk-through should have meaningful performance requirements and their K/A (knowledge and ability) importance factors, which were derived by a panel of subject matter experts from the industry and NRC, should be at least 2.5.

2. Our experience has been that we are told ALL items of 10 CFR 55.45 and 55.43(b) must be sampled.

If 100% of sampling for topics in 55.45(a) is not required, is there a definition of representative sample?

What is meant by a "representative sample" of the 13 items identified in 10 CFR 55.45(a)?

Section B of ES-301 states that all 13 items in 10 CFR 55.45 do not need to be sampled on every operating test. Although NUREG-1021 does not include a similar statement with regard to the written examination, the same policy still applies. In accordance with Section D.1.b of ES-401, the topics for the written examination are to be systematically selected from the appropriate Knowledge and Abilities Catalog (NUREG-1122 or 1123). Although the NRC has not developed a definition of a "representative sample," logic dictates that it should include a reasonably complete, thorough, balanced, and varied cross-section of the items in the population to be sampled. All of the items should be sampled from time to time, and, absent a basis for emphasizing certain items, it is expected that every item would be sampled at about the same frequency. An examination constructed in accordance with NUREG-1021 will normally contain a "representative sample" of the required items.

3. Do the audit exam and the NRC exam have to be 100% different (D.1.a)?

ES-301, D.1.a - No reuse of audit material for subsequent exams?

To what extent do "similar events" between the audit and NRC exam need to be identified? For example, if the audit examination contained a faulted SG [steam generator] in one scenario (safety valve stuck open) and the NRC examination contained

a faulted SG (pipe rupture in containment), would these situations be considered "similar?"

No. As noted in Section D.1.a of ES-301 (NUREG-1021), simulator events and JPMs that are similar to those that were used on the audit test (or audit tests in the case of retake applicants) are permitted provided the actions required to mitigate the transient or complete the task (e.g., using an alternate path as discussed in Appendix C) are significantly different from those required during the audit examination. The facility licensee shall identify for the NRC chief examiner those simulator events and JPMs that are similar to those that were tested on the audit examination.

The two events cited in the example are "similar" (in that they both involve a faulted SG) and should be discussed with the NRC chief examiner. In this case, the mitigation strategy for the two events - one being inside and the other outside containment - are sufficiently different that their use would probably be acceptable (unless there were other predictable patterns between the two scenarios).

4. Can there be scenario repetition with similar transients?

Although the same scenarios and job performance measures may not be repeated on subsequent days during the examination week(s), events and tasks that are similar to those that were tested on previous days during that examination are permitted provided the actions required to mitigate the transient or complete the task are significantly different from those required on the previous examination. This is consistent with the policy for repeating events and tasks from the applicants' audit examination as stated in Section D.1.a of ES-301.

5. How is the JPM system selection supposed to occur? Shouldn't there be a systematic (e.g., random) selection of systems within each of the safety functions? Otherwise, won't the operating exam be somewhat subject to predictability? Same concern with event selection for simulator exams (scenarios).

Section D.1 of ES-301 discusses a number of general guidelines applicable to the entire operating test, and Sections D.2 through 4 provide specific guidance applicable to the walk-through, including the requirements to distribute the JPMs among the applicable safety functions and administrative topics, to limit the repetition of tasks from the previous licensing exam, and to include new and modified tasks on each test. Although ES-301 does not specify the use of systematic or random sampling for the operating test as ES-401 does for the written exam, that would certainly be an acceptable method for determining the test content.

6. The continuous ratcheting of expectations is bypassing the [systematic approach to training] SAT process. Example - Cannot use a high importance JPM because it is perceived to be too easy, and operators are trained and tested on it.

Current subjectivity on what is a discriminatory JPM with the removal of the questions.

Why can't the selection of JPM's for the license exam be driven by the SAT process and K/A value? "Low discriminatory value" is a euphemism for "too easy" and as a result,

the difficulty of the exam is ratcheting up to an unreasonable level. This is contrary to the NRC stated goals.

The NRC does not agree that the difficulty of the walk-through portion of the operating test is being ratcheted up to an unreasonable level. On a nationwide basis, the RO and SRO operating test passing rates have generally ranged between 94 and 98 percent since the early 1990s. Refer to the examination performance trend graphs posted on the Licensing Process page.

Keep in mind that the NRC licensing examination is not a part of the facility licensee's SAT-based training process. As stated in 10 CFR 55.45(a), the content of the operating test will be identified, in part, from the learning objectives derived from a systematic analysis of operator duties performed by the facility licensee.

As stated in Section D.4.b of ES-301(NUREG-1021), the JPMs should, individually and as a group, have meaningful performance requirements that will provide a legitimate basis for evaluating the applicant's understanding of and ability to safely operate the associated systems and the plant (as required by 10 CFR 55.45). Previously, when each system evaluation consisted of a JPM plus at least two prescripted follow-up questions, the questions would sometimes compensate for the minimal discriminatory potential of the JPM. Now that the prescripted questions have been eliminated, examiners have been instructed to place increased emphasis on the discriminatory value of the JPMs. However, that does not mean that high importance JPMs will be excluded from the sample. High-importance JPMs will always be acceptable if they discriminate and provide a legitimate basis for evaluating the applicants' understanding of and ability to safely operate the associated system. A walk-through test that is heavily weighted with simplistic, one- or two-step tasks during which everything works as designed will not provide the NRC with an adequate basis to make a licensing decision.

7. My 1998 exam was comprised of 20 JPMs. The 1999 exam is comprised of 30 JPMs (3 sets of 10). If I repeat 30% of the 1998 JPMs, I can use a total of 6 JPMs on the 1999 exam or 30% of each of the 3 sets of 10 JPMs is 9 JPMs. Is it 30% of the JPMs of the previous exam or is it 30% of the current exam that can be repeated?

The repetition limits specified in ES-301 (refer to Forms ES-301-1 and 2) apply to the current operating test, and, beginning with Revision 9 of NUREG-1021, will limit the use of JPMs to be randomly selected from the last two licensing examinations at the facility. Therefore, each of the three 10-JPM sets for 2004 can include no more than three JPMs from among the 20 that were used on your 2002 and 2003 operating tests. You can not use all nine of the repeated JPMs on one test set and none on the other two, and the same JPMs can not be repeated on subsequent days. Ideally, the test sample should be developed systematically from the total population of operator tasks and then checked to confirm that the repetition from the previous exam is within limits.

8. When determining allowable JPM overlap for a retake applicant, do you use the exact 10 JPMs the applicant saw on the original exam or the entire JPM set used for the exam? (These numbers could be different.)

In accordance with ES-301 of NUREG-1021 (refer to Form ES-301-2), the current systems walk-through may repeat up to 3 JPMs randomly selected from the last two licensing examinations (including all the operating test sets) at the facility. However, the 30% is an upper limit and may not be appropriate in the case of retake applicants. Section D.1.a also prohibits the repetition of any exact-same items from the applicant's audit test or tests, in the case of retake applicants. Similar items (with different success paths) may be acceptable and shall be identified to the NRC chief examiner for approval.

9. Please define "alternate path" JPMs and give one or more examples. Does a fault have to occur to qualify as an "alternate path" JPM?

What is the difference between a faulted JPM and an Alternate Path JPM?

The concept of alternate path JPMs is discussed in some detail in Section C of Appendix C of NUREG-1021. Although most alternate path JPMs do involve some sort of system fault, the goal is to assess the applicant's response to a situation that is not as it should be or is somehow different from what the applicant might have expected based on the initiating cue for the task.

Alternate path and faulted JPMs are effectively synonymous.

10. Use of 4 of 10 faulted JPMs I believe is "negative" training and evaluation. I expect our plant to operate every time. Maybe for 2 of 10 faulted is fine. 4 of 10 will train the operators to expect the plant controls not to function. Should maybe be PRA based?

We acknowledge your concern. The NRC is sensitive to the issue of negative training but is also obligated to ensure that the licensing examinations do not become predictable and effectively discriminate between safe and unsafe applicants. Experience showed that some JPMs may not provide an adequate basis for evaluating the applicants' understanding of the system unless they require the applicant to exercise an alternate success path. Therefore, the number of alternate path JPMs was increased to compensate for the elimination of prescripted questions with every JPM. As discussed in the previous question, system faults provide only one source of alternate path JPMs. It would certainly be appropriate to use risk insights when selecting operator actions to be tested using alternate path JPMs.

11. For examinations spread over two weeks, are different administrative job performance measures required?

Yes. As stated in Section D.1.a of ES-301, the same job performance measures and simulator scenarios shall not be repeated on subsequent days (i.e., they shall not be used for more than one day during an examination).

12. Why are we using more JPM's [job performance measures] for the administrative section?

Since Revision 8 of NUREG-1021, the NRC has preferred to test the five administrative topics using JPMs rather than questions because JPMs are generally a better, more performance-based measurement tool. When Revision 9 combined the administrative and systems walk-through portions of the operating test, good testing and measurement practice prompted the NRC to shift entirely to a JPM format rather than retain the option for mixed testing media in the combined walk-through.

13. What is counted in the simulator?

As stated in Section D.5.d of ES-301, an applicant should only be given credit for those events that require the applicant to perform verifiable actions that provide insight to the applicant's competence. The required instrument and component failures should normally be completed before starting the major transient; those that are initiated after the major transient should be carefully reviewed because they may require little applicant action and provide little insight regarding competence. Each event should only be counted once per applicant; for example, a power change can be counted as a normal evolution OR as a reactivity manipulation, and, similarly, a component failure that immediately results in a major transient counts as one or the other, but not both.

14. Would it be appropriate to do an administrative job performance measure during the systems or dynamic portion of the operating test?

Yes. Section D.3 of ES-301 encourages examiners to integrate the evaluation of the administrative topics into the systems and simulator evaluations because it improves the flow of the operating test. For example, as noted in Section D.3.d of ES-301, the "Emergency Plan" can be evaluated by integrating it into a simulator transient that requires implementation of the emergency plan. Similarly, an alternate path job performance measure in which a component fails could set the stage for an equipment clearance job performance measure for "Equipment Control." As noted in Section D.3, the applicants' proficiency in the administrative topics should be deliberately evaluated and not inferred from observations made during the simulator operating test. Moreover, in accordance with Section D.3.n of ES-302, examiners will limit their discussions with the applicants while the scenarios are running so as not to create a distraction.

15. Operating Exam - Admin.: This part of the exam process needs to be integrated into the written and JPM (walk-through) segments, and eliminated as a separate entity - only a couple of areas are examined, with no margin for error! An individual can score high on the written exam, do excellent on the simulator, and pass all of the systems JPMs yet fail to get licensed due to not passing a couple of admin "questions" - the knowledge and/or abilities could easily be included with other exam segments.

Why is the admin[istrative] area a stand-alone area on the exam? Why is it even there at all?

JPM [job performance measure]/Admin sample rate is small. Therefore more than 1 failure results in an overall failure. Is it possible to get something with more balance?

As discussed in Section B.1 of ES-301(NUREG-1021), the "Administrative Topics" of the operating test implement Items 9 through 12 of 10 CFR 55.45(a). Prior to Revision 4 of NUREG-1021, which was issued in May 1987, examiners often made too many inferences regarding the applicants' understanding of the administrative topics based upon their actions in the simulator. Therefore, the NUREG was revised to require examiners to discuss and evaluate a selection of administrative topics in a separate operating test category.

However, based on stakeholder feedback during a number of public meetings in 2001 and 2002 (refer to the Operator Licensing Public Involvement page), the NRC concluded that the scope and format of the operating test had placed too much emphasis on the administrative topics. Consequently, with Revision 9 of NUREG-1021, the NRC has consolidated the administrative and systems topics into a single walk-through operating test, consisting entirely of JPMs. The revised test structure replaces one of the RO administrative tasks with an extra task in the systems area and generally de-emphasizes the administrative topics (refer to Section D.3 of ES-301).

16. Is it NRC policy for every JPM [job performance measure] to have adverse safety consequences if the operator makes an error?

No. As stated in Section D.1.c of ES-301, the K/As covered during the operating test should have importance factors of at least 2.5. Moreover, as stated in Section D.4.b, the JPMs should, individually and as a group, have meaningful performance criteria that will provide a legitimate basis for evaluating the applicant's understanding of and ability to safely operate the associated systems and the plant. Although Section D.3.b of ES-303 requires examiners to explain the safety consequences (as applicable) of the applicant's errors, this should not be misconstrued as a requirement for every JPM to have adverse safety consequences if the applicant makes an error.

Refer to FAQ #6 for a related discussion regarding discriminatory JPMs.

17. Does the exam have to cover RP [radiological protection] and EP [emergency planning] (10 CFR 55.43)?

Why does there have to be an administrative JPM [job performance measure] on radiological items/E-plan for RO's? This is GET (general employee training) material!

Why are GET-type radiation area, contaminated area, radiological work permit (RWP) JPMs involved in a license exam? These are not discriminatory to a SAFE LICENSED operator. GET should be left to GET and eliminated as a part of the licensing exam.

The regulations currently require the written examination and the operating test to cover a representative sample of the items listed in 10 CFR 55.41/43 (depending on the license level) and 55.45, respectively, to the extent that they are applicable to the facility. With regard to testing GET-type topics, exam developers should strive to write questions or JPMs that test the

applicants at a licensed level, such as their response to a problem that would be part of their licensed duties. Refer to FAQ #2 for a discussion of "representative sampling."

As discussed in response to FAQ#15 above, Revision 9 of NUREG-1021 has restructured the walk-through operating test to de-emphasize the administrative topics, particularly for RO applicants. As outlined in Section D.3.a of ES-301, RO applicants will be tested on four, rather than five, administrative tasks, and they generally need not be evaluated on each of the four administrative topics (“Equipment Control,” “Radiation Control,” or “Emergency Plan” can be omitted by performing two tasks related to “Conduct of Operations”). This affords the test developer greater flexibility in tailoring the content of the test to ROs’ job requirements at the facility.

Operator Licensing Program Feedback

ES-302
Administering operating tests
for initial licensing examinations

1. If the shift technical advisor is licensed, is he at risk if he is a surrogate? Can anyone do it?

Can a formerly licensed or certified person be used as a surrogate on an initial examination?

If a licensed operator is filling the role of a surrogate operator, and he/she performs errors, is his/her license in jeopardy (by the NRC)?

Is the NRC going to provide specific guidance for the use of surrogates in the exam process?

Section D.1.j of ES-302 (in NUREG-1021) addresses the use of surrogates and shift technical advisors.

Although licensed operators are generally preferred, NUREG-1021 does not require the surrogate operators during the dynamic simulator operating test to be licensed. Anyone who does play a surrogate role must be knowledgeable and competent because, per Section D.1.j of ES-302, they will be expected to assume the full responsibilities of the roles they take during the test. Using unqualified surrogates may place the license applicants at greater risk of failure if the surrogate makes an error.

Surrogates who are licensed operators are at risk because the NRC expects facility licensees to take remedial action (including removal from licensed duty, retraining, and testing, as appropriate) if a licensed operator makes significant performance errors during the operating test or while on shift in the control room.

The NRC could take licensing action against the individual pursuant to Subpart G of 10 CFR 55, but it has never done so in the case of an operator filling a surrogate role during a simulator operating test. The NRC would only take such an action as required to protect the public.

2. Can an applicant fill the STA role during a scenario? If yes, can he/she actively fill the role or will "normal" surrogate activity be expected?

No. Section D.1.j (second bullet) of ES-302 clearly states that another applicant will, under no circumstances, be allowed to witness an operating test.

3. What role can the STA play when they are the extra person?

ES-302 - General (D.1.j) - What determines if an STA is "necessary"?

Operator Licensing Program Feedback

Although the rules now allow the use of surrogates as STAs, we severely limit the surrogates role as part of the team. This results in training the candidates under conditions, roles and responsibilities that are different than real operating practice and standards. Why do we limit the STAs role resulting in a "train for the exams" culture?

As stated in Section D.1.j (first bullet) of ES-302 (in NUREG-1021), consultations with an STA shall be conducted in accordance with the facility licensee's normal control room practice; e.g., an STA shall not be stationed in the simulator if they are on-call at the site. The STA should not take a proactive role in assisting or coaching the applicants because it would hinder the examiners' ability to evaluate the applicants' competence. ES-302 requires examiners to brief STAs on the content of the scenarios and their expected actions in response to every event. Examiners will run additional scenarios if necessary to make a licensing decision.

4. Can we use more than 2 ROs if Technical Specifications (TS) require it? Does this apply to administrative requirements (e.g., however ops may use more than 2 ROs)?

Can we increase the number of candidates/scenario?

If the facility's TS (not administrative procedures) require more than 2 ROs in the control room, the NRC will allow additional surrogates during the simulator operating test to fill the normal crew complement. There will never be more than two RO applicants on any simulator operating crew. Refer to Section D.1.j of ES-302.

5. For purposes of appeal - why is video taping of scenarios NOT allowed? I'm not looking for rule change; more what forms of documentation should be used and kept for appeal purposes.

Why discriminate against taping initial operating tests when there is no similar requirement in ES-600 series?

Why is video taping the operating test prohibited?

At the time the no-taping policy was set, experience indicated that video taping would not provide sufficient detail to support individual licensing decisions for every member of the operating crew. Moreover, the practice was considered intrusive to the applicants and examiners, and several facility licensees expressed concern over how the video tapes would be used. This issue was addressed in response to Question Nos. 403 and 404 in NUREG-1262, "Answers to Questions at Public Meetings Regarding Implementation of Title 10, Code of Federal Regulations, Part 55 on Operators' Licenses."

In accordance with Section D.3.f of ES-302, the licensee should, in coordination with the NRC chief examiner, record as many key parameters as possible and provide a copy of the recordings to the chief examiner for use in the grading process. This is particularly important if the applicants failed to accomplish the expected actions and there is a possibility of a test failure. The examiners will collect and retain other forms of documentation (e.g., logs, notes, and checklists) generated by the applicants.

6. Do SRO-upgrade applicants acting as RO panel operators to complete a crew have to have a specific evaluator observe them (B.3)?

No. As noted in Section D.1.d of ES-302 (in NUREG-1021), if a three-person operating crew consists entirely of senior reactor operator (SRO) upgrade applicants (who do not have to be evaluated on the control boards), the chief examiner may assign only two examiners to observe the crew. Although the applicants in the reactor operator and balance of plant positions may not be individually evaluated, they will be held accountable for any errors that occur as a result of their action(s) or inaction(s) and graded on their ability to "Operate the Control Boards" (i.e., SRO Competency 3). SRO-instant applicants will always be individually evaluated by an NRC examiner regardless what operating position they are filling during a given scenario.

7. Why can't we add a Shift Manager to the NRC-examined crew to handle communications, etc?

As explained in Attachment I (Section II) of SECY-98-266, the staff does not permit more than one person to fill a senior operator position during the simulator test because the principal duties of the shift manager position (i.e., assuming the role of the emergency director, performing emergency classifications, and making protective action recommendations) are normally a part of the operating test for senior operator applicants.

8. When evaluating SRO success in "Classifying the [radiological emergency plan] REP" during the operating exam, what criteria do the examiners use for when to start the 15 minute clock (expectation)? (15 minutes from event to classification)

Since the simulator operating tests for the initial licensing examination are conducted with only one applicant in the SRO position, the NRC does not require the SRO to complete the emergency classification within the normal period of time. In most cases, the applicant is asked to classify the event after the scenario is complete and the simulator is in freeze. Another option is to do a separate emergency plan classification as a JPM, which is only considered time-critical if the facility licensee has a validated time standard.

9. Do you tell a person that it is a time-critical task?

Yes. Part D, Item 4 of Appendix E requires examiners to describe the initial conditions, explain the task to be completed, explain which steps to simulate and which ones to discuss, and indicate whether the task is time critical.

10. If during a JPM, the applicant misses or skips a procedure step or steps and later on recognizes that he/she has missed the steps - can he/she request to start the JPM over?

No. The applicant can not start the JPM over, but can perform the missed step(s) after complying with the facility's policy for reporting procedural errors and receiving permission. This is consistent with the grading policy in Section D.2.a of ES-303, which states that if an applicant initially misses a critical step, but later performs it correctly and accomplishes the task standard without degrading the condition of the system or the plant, the applicant's performance on that JPM would generally still be graded as satisfactory. The examiner would be expected to ask

follow-up questions based on the applicant's error, document those questions and answers, and determine a system grade based on the applicant's overall performance.

Once the applicant has completed the JPM, he or she can not go back and start over, but the examiner will consider any corrected information provided when grading the operating test (refer to Section D.2.f of ES-302 (in NUREG-1021). Note that if an applicant exceeds twice the validated time estimate for any JPM (including time-critical) because he or she has selected an incorrect procedure or operated the wrong equipment (despite being presented with sufficient plant feedback to correct the error), the examiner should stop the JPM, document the circumstances, and proceed with the next JPM. However, if the applicant is on the correct path but has simply stopped making progress toward completing a non-time-critical JPM, the examiner should ask the applicant to describe the work to be done and how long it should take to complete the JPM. If the applicant does not then make timely progress toward completing the described actions, the examiner should inform the applicant that the allowed time for the JPM has elapsed and the applicant will be evaluated on the work completed. The examiner should then proceed with the next JPM.

11. If an applicant shows system knowledge weaknesses during administration of a JPM, how far can the examiner go with the non-prescripted questions? Can the examiner ask questions about another system or another function of the same system covered in the JPM?

As stated in Section D.2.f of ES-302, the examiner should ask question as necessary to confirm the applicant's understanding of the system as it relates to the task that was performed. The examiner should not ask questions about another system or another function of the same system unless it relates to the task that was performed.

12. Is there a "standard" method for applicants to answer open reference walk-through questions (i.e., if fairly certain of answer give it or always look it up)?

There is no standard method for applicants to answer follow-up questions during the operating test. If they are confident that they know the answer, there is no need to look it up. Examiners are not required to confirm the source, and looking up every answer can significantly extend the length of the test. As discussed in Attachment 1 of ES-301, the operational orientation required of follow-up questions on the walk-through test and the applicant's access to reference documents, argue against the use of questions that test for recall and memorization. Any follow-up questions that do not require any analysis, synthesis, or application of information by the applicant should be answerable without the aid of reference materials. Furthermore, as stated in Part D, Item 8 of Appendix E, if the applicant needs to consult a reference to answer a follow-up question, the applicant should ask the examiner if it is acceptable to do so. Although there is no specific time limit for any question, an applicant may be evaluated as unsatisfactory on a question if he or she is unfamiliar with the subject or reference material and is unable to answer the question in a reasonable period of time. Applicants will not be permitted to conduct unlimited searches of the plant reference material during the examination.

Operator Licensing Program Feedback

ES-303
Grading operating tests for initial licensing examinations

1. There are no longer going to be prescripted follow-up questions for job performance measures, but job performance measure questions will be evaluated - please explain.

Revision 7 of NUREG-1021 required every system selected for evaluation in the walk-through operating test to be examined with a job performance measure, at least two prescripted questions, and additional follow-up questions as deemed necessary by the examiner to investigate the applicant's performance deficiencies. Although Revision 8 of NUREG-1021 eliminated the prescripted questions, examiners are still required to ask for-cause follow-up questions, if necessary, based on the applicant's performance and to consider the applicant's answers to those questions in the grade for the applicable system. (Refer to Section D.2.a of ES-303.)

2. ES-303 needs more specific documentation for final results (i.e., some way for very specific feedback to candidate).

Comment noted. Section D.3.c of ES-303 requires examiners to document every deficiency noted during the operating test. However, only those deficiencies that contribute to a test failure need to be justified in detail. The test report is not intended to be a retraining vehicle; the facility licensee should be able to take the information provided and develop more specific feedback and training for the applicants.

3. Will operating test follow-up questions be documented?

Can they fail an applicant even though he accomplished the critical step (task)?

Yes. Section D.2.f of ES-302 requires examiners to document all performance-based questions and answers for later evaluation.

Yes. Per Section D.2.a of ES-303, an applicant could fail even though all the critical steps were accomplished. The examiner must justify the basis for the unsatisfactory grade in accordance with Section D.3 of ES-303.

4. What is meant by "critical task errors are not essential?"

With regard to the dynamic simulator operating test, it means that an applicant does not have to miss a critical task to justify a low grade on a rating factor or an overall failure of that test (as explained in Section D.2.b of ES-303).

With regard to the systems walk-through, it means that an examiner can ask performance-based follow-up questions even if the applicant was able to perform every critical step and accomplish the task standard (as explained in Section D.2.f of ES-302). Moreover, per Section D.2.a of ES-303, an examiner can recommend an unsatisfactory grade for a system

based on the follow-up questions even if the applicant completed all the critical steps. The examiner must justify the basis for the unsatisfactory grade in accordance with Section D.3 of ES-303.

5. Is there written guidance on pass/fail for non-prescripted questions?

Yes. Section D.2.a of ES-303 (in NUREG-1021) describes how examiners will grade the job performance measure follow-up questions. NRC examiners bear the burden of justifying an unsatisfactory grade for the system if the applicant was able to accomplish the task standard. Both the chief examiner and the regional operator licensing branch chief must also concur in the failure recommendation.

6. If a candidate is performing a job performance measure (JPM), and during the performance of the task performs an unsafe action with respect to personnel safety, does this constitute a failure of the JPM?

It may, depending on the safety significance of the applicant's action. Section C.2 of ES-303 allows the NRC examiner to recommend a failure if an applicant made an error with serious safety consequences even if the grading instructions in Section D would normally result in a passing grade. Normally, this would require adverse consequences related to reactor safety, however, it could also apply to personnel safety issues with potentially serious consequences. Under such circumstances, the examiner shall thoroughly justify and document the basis for the failure in accordance with Section D.3.b. Moreover, the NRC regional office shall obtain written concurrence from the NRR operator licensing program office before completing the licensing action.

Operator Licensing Program Feedback

ES-401
Preparing initial written examinations

1. I do not feel that the written exam is a discriminatory tool. How many people do poorly on the written exam but are not weak on the operating test? Let us use our process to take care of the written with our audit exam.

Recommendation noted. As is evident from the transition program that was completed in 1999, the NRC is generally in favor of increasing power reactor facility licensees' involvement in the examination process. Additional changes are possible if the NRC concludes that they will reduce unnecessary regulatory burden, increase public confidence, improve efficiency and effectiveness, and maintain reactor safety.

The NRC has not analyzed applicants' grades on the written exam and operating test to see how well they correlate. However, it is true that some applicants who fail the written examination do quite well on the operating test, while others who fail the operating test perform well on the written exam. The NRC believes that both parts of the licensing examination are important. As discussed in Section B.1 of Appendix B, the importance of knowledge testing (i.e., the written exam) should not be underestimated since knowledge is the underpinning of professional performance. The objectives of knowledge testing are varied; they may include assessment of fundamental understandings as well as testing more advanced levels of expertise. The most effective tests of knowledge include questions and test items that measure applications of knowledge directly related to the job. In the case of the NRC operator licensing examination, the written examination provides a key measure that allows a confident decision to be made on the safety significant performance of the individual seeking a license.

2. There are still occasions in NUREG-1021 for examination requirements that are subjective and, therefore, can (and will) vary from Region to Region and examiner to examiner.

What are the objective criteria for determining that an exam question is SAT[isfactory] or UNSAT[isfactory]?

The criteria for determining whether a written examination question is satisfactory are summarized on Form ES-401-9 and discussed in Appendix B of NUREG-1021.

The NRC acknowledges that some of the guidance in NUREG-1021 still requires examination authors, NRC examiners, and their supervisors to judge the level of knowledge, level of difficulty, quality of distractors, and other psychometric aspects of the examination. Nevertheless, the NRC believes that writers of examinations and NRC examiners who are trained in the subject matter, measurement principles, and psychometrics, and who have general knowledge of operator and trainee performance on similar test items, can make informed judgments in these areas based on the guidance in NUREG-1021. Section II of Attachment 1 of SECY-98-266, the paper that forwarded the final operator licensing examination rule change to the Commission for approval, responded to a similar comment.

Operator Licensing Program Feedback

3. How do we determine "level of difficulty" for written exam questions?

What is the process for determining the level of difficulty for a question?

Where can I find the criteria for the 1-5 difficulty rating on exam questions? Has any utility perfected the application of this?

A level of difficulty should be established that discriminates between applicants who have and have not mastered the required knowledge, skills, and abilities. Section C.3 of Appendix A and Section C.1.e of Appendix B discuss the concepts of discrimination validity and level of difficulty.

NRC examiners are required to rate the level of difficulty of every written examination question that has not been previously validated by the NRC at that facility. This is done using a 1-5 (easy - hard) difficulty rating scale as specified on Form ES-401-9; questions in the 2-4 range of difficulty are acceptable.

4. Evaluate changing initial exam grading to a curve for pass/fail.

As noted in Section C.3.a of Appendix A of NUREG-1021, the NRC's initial and requalification examinations, like most licensing examinations, are criterion-referenced rather than norm-referenced tests. This means that there is a pass-fail or minimal cut score or grade that every examinee must achieve to demonstrate sufficient knowledge and ability to safely operate the power plant.

If the passing grade is determined by comparing each applicant's score with that of the group taking the examination at that time, an applicant who scores in the low 80s could fail if all the other applicants score above 90%.

5. If the utility is producing the written exam, when (how many days/weeks) is your expectation for the chief [examiner] to get the sample plan to the utility? The point is - getting the sample plan in accordance with NUREG-1021 will not work.

As stated in Section D.1.e of ES-401, the examination outline should normally be completed about 75 days before the scheduled examination date. The actual due dates must be negotiated and confirmed with the NRC Regional Office (chief examiner and/or branch chief) at the time the examination arrangements are confirmed (refer to Section C.2.c of ES-201). If the facility licensee needs more than 75 days to prepare an examination based on an NRC-developed outline, it needs to work out the schedule with the Regional Office.

6. Clarify what you mean by "random selection." Does the random selection have to go all the way down to the specific K/A number?

For purposes of the NRC’s licensing examination, random means without bias or predisposition.

Yes. Section D.1.b of ES-401 requires the K/As to be systematically and randomly selected from the applicable NRC K/A catalog. Attachment 1 of ES-401 describes a sample method for selecting K/As, with Step 4 specifically instructing that the K/A statements within each randomly

selected K/A Category will also be randomly selected. If you select a K/A that is not applicable to your plant or that has an importance value less than 2.5, you may have to randomly select another K/A statement. Failure to train on a selected K/A is not an acceptable basis for selecting another one. If you determine, when reviewing the completed outline in accordance with Section D.1.d, that one of the K/A Categories is over- or under-sampled, you should randomly select another K/A. In accordance with Section D.2.f, if your question bank contains more than one question applicable to the selected K/A and there is no appropriate basis for selecting a specific question (e.g., cognitive level, discrimination validity, operational orientation) it would be best to randomly select from among the questions rather than chose the same question every time.

In accordance with Section D.1.b, facility licensees shall describe for the NRC the process that was used to generate the examination outline and the reasons for rejecting any randomly selected K/A statements.

7. What do you do if your randomly selected questions identify a K/A that you know was not trained on or has been deselected for training? Do you ask it anyway or do you select another system or does it go deeper?

Can you change a K/A if no one can write a question for it?

What if a random K/A [knowledge or ability] can not be used to prepare a discriminating question? Is it fair to replace the K/A with one that is more difficult? (Can we throw out a K/A simply because it is too hard to write a discriminatory question?)

Section D.1.b of ES-401 (in NUREG-1021), allows the examination author to systematically and randomly select another K/A category and/or statement, as applicable, if the systematic selection process identifies a K/A statement having an importance rating that is below 2.5, a K/A statement that clearly does not apply to the subject facility, a generic K/A statement for which it would not be possible to develop a Tier 1 or Tier 2 question, or a K/A category that contains no K/A statements. Failure to train on a selected K/A is not an acceptable basis for selecting another one. The author should use Form ES-401-4, "Record of Rejected K/As," or an equivalent, to document the basis for excluding from the examination outline any K/A statements that were randomly selected, and submit the form to the NRC with the completed outline.

As stated in Section D.2.a of ES-401, if it becomes necessary to deviate from the previously approved examination outline, the facility contact is expected to discuss the proposed deviations with the NRC chief examiner and obtain concurrence. The facility should be prepared to explain why the original proposal could not be implemented and why the proposed replacement is considered an acceptable substitute.

Operator Licensing Program Feedback

8. Regarding ES-401 and the random selection of K/A's: How do you document obvious non-applicable K/A's to the chief examiner? Can we remove them prior to the random selection or do we select and then drop (with documentation) from the sample plan?

As stated in Section D.1.b of ES-401, facility licensees can reject and explain K/As as they prepare the exam outline, pre-screen the entire K/A catalog to eliminate inapplicable K/A statements before beginning the random selection process, or take a combination of these approaches when preparing the examination outline. If the facility licensee decides to pre-screen the K/As, it should make arrangements for the NRC regional office to review the associated documentation and justification prior to submitting the examination outline. Form ES-401-4,"Record of Rejected K/As," or an equivalent should be used to document the basis for rejecting/deselecting K/As.

9. How close does model have to be to actual?

As stated in Note 2 on the bottom of Forms ES-401-1 and 2 of NUREG-1021, the actual point totals for each group and tier on the proposed examination outline must match those specified in the applicable table. However, the final point total for each group and tier, based on revisions required by the NRC reviewers, may deviate by 1 from that specified in the table. The final RO exam must total 75points and the SRO-only exam must total 25 points.

10. After systematically/randomly generating a sample plan you discover it is lopsided in one area, how do you "balance" the exam? Where do the questions come from?

If, for example, the systematic/random outline for Tier 2 ends up with 7 items under Category K1 and only 1 item under Category K4, you can balance the coverage by randomly deselecting one of the items in Category K1 and then randomly selecting a replacement item for the same system from Category K4. If Category K4 for that system does not include a K/A with an importance rating of 2.5 or higher, you can randomly select another system within the same group. Always remember to document and justify any changes in accordance with Section D.1.b of ES-401. The questions used to implement the outline once it is approved by the NRC shall be taken from the bank, modified from bank questions, or newly developed in accordance with Section D.2 of ES-401.

11. Tech[nical] spec[ifications] (TS) are too complicated to memorize. They should be open reference or better yet covered by the operating exams (JPM). We do not want our operators to spend valuable time memorizing TS, nor do we want them to operate from memory.

The NRC does not expect operators to memorize the TS, nor does it endorse operating the plant from memory. However, the NRC does expect operators to recognize TS entry conditions, immediate actions, and (in the case of senior operators) bases when presented in a multiple choice format on the written examination. If they do not compromise the integrity of other questions on the exam, it is acceptable to provide extracts from the TS to the license applicants for use in answering application-level questions.

12. Based on the SAT-based training program, you test on objectives. The current NUREG-1021 allows asking questions not covered by the utility's training program (objectives). This is contrary to the SAT-based training system. Should there be a way to ensure the students are examined on the training program content? (If it is determined that the program is SAT.)

Learning objectives are not required for the NRC examination, but our SAT-based program still requires them. Do we no longer follow our SAT-based program?

Attachment 1 (Section II) to SECY-98-266, the Commission paper associated with the April 1999 final rule, responded to a similar public comment on Interim Revision 8 of NUREG-1021. It notes that Sections 55.41(a), 55.43(a), and 55.45(a) of the rule state that the knowledge, skills, and abilities selected for evaluation on a written examination and an operating test will be identified, in part, from learning objectives derived from a systematic analysis of licensed RO and SRO duties performed by each facility licensee. While the answers to Questions 129 - 130 in NUREG-1262, "Answers to Questions at Public Meetings Regarding Implementation of Title 10, Code of Federal Regulations, Part 55 on Operators' Licenses," confirmed the NRC's intent that the training program's learning objectives would become the major source of the licensing examination, it also cautioned that the NRC would not be limited to those learning objectives.

The NRC licensing examination is not a part of the facility licensee's SAT-based training process. The systematic sampling procedures for preparing the written and walk-through examination outlines per NUREG-1021 are designed around the structure of the NRC's K/A Catalogs and may not be compatible with the facility-specific task lists. NUREG-1021 contains provisions for facility licensees to add, substitute, or delete specific knowledge and ability requirements on a case-by-case basis. Allowing facility licensees to substitute their entire site-specific task lists for the NRC's K/A Catalogs could decrease the level of examination consistency. The current approach of requiring facility licensees to explain deviations from the NRC's K/A Catalogs is conservative, consistent, and effective.

Facility licensees should continue to follow their SAT-based training programs, with the understanding that the content of the NRC licensing examination is not necessarily restricted by the SAT-based training process. Licensees should consider developing learning objectives covering all the topics required by 10 CFR 55 and all the NRC K/As having importance ratings of 2.5 or higher, unless it can demonstrate that the K/A is not applicable at their facility.

13. If learning objectives say that, ". . . given a copy of procedure," can we use as closed reference [question]?

In accordance with Section D.2.g of ES-401, a facility learning objective is not necessarily required for every question. However, if one is referenced it should be adhered to unless the licensee makes a conscious decision to deviate from it. In those cases, the licensee should consider revising the learning objective to match the question.

The NRC does not review every learning objective during the approval process. When a question appears on the examination, the NRC will conclude that the facility licensee expects its operators to be able to answer the question without a reference regardless what the learning

objective says. If such a question is challenged during a license appeal, the NRC may ask the facility licensee to support the question in writing as discussed in Section C.2.a of ES-502.

As noted in Section D.2.g of ES-401, reference materials may be used on a selective basis as attachments to the written examination, provided they do not give away the answers to any of the questions or improve the applicant's chances of guessing the correct answer by eliminating incorrect distractors.

14. The definition of knowledge based versus higher order is not clear. Explain.

Sections C.3.c of Appendix A and C.1.d of Appendix B of NUREG-1021 discuss Bloom's Taxonomy and briefly explain the three levels of knowledge (i.e., fundamental knowledge or simple memory; comprehension; analysis, synthesis, or application). Attachment 3 of Appendix B cites Benjamin Bloom's book on the subject as a reference tool that explains the concept in greater detail.

15. Once we use a comprehensive level question, does it become a knowledge based question the next time we use it?

No. As stated in Section D.2.c of ES-401, the cognitive level of any question taken from the bank will be counted at its face value, even though it may function at a lower level because it is available for study (refer to Section C.3.e of Appendix A of NUREG-1021).

16. Regarding the ES-400 series. Discrimination validity should not be evaluated separate from operational validity and content valid. If operational validity and content validity are present, then discrimination will be present if good test item writing principles (e.g., plausible distractors, absence of clues) are applied.

Remove level of difficulty evaluation from Form ES-401-9 and all other requirements. There is no need to assess difficulty if content validity, operational validity, and 50-60 higher cognitive level requirements are met.

Why is it unacceptable to have a question with a difficulty rating of "1," if that is what the randomly generated sample plan called for?

Comments noted. However, to determine whether an item has discrimination validity you must ask yourself whether an applicant who has not achieved the minimum level of competence is likely to miss the answer and be drawn to a distractor. Questions can be psychometrically sound, content valid, and operationally valid, but still not discriminate well. Refer to Section C.3 of Appendix A of NUREG-1021 for a discussion of discrimination validity.

The sample plan does not prescribe the difficulty level for questions; rather, the sample plan determines the topical content areas from which test items will be developed. Moreover, K/A importance values should not be confused with item difficulty measures. Easy questions can be created from high importance K/As and difficult questions can be created from low importance K/As.

17. Why is a validated question not a good question?

Although a question that was previously used on an NRC examination at the facility since 10/1/95 (i.e., a validated question) may be acceptable in its own right, it may have to be edited or replaced if it conflicts with another question on the examination or if necessary to meet the criteria on the Written Examination Quality Checklist (Form ES-401-6 in NUREG-1021). Technical and psychometric flaws that cause the question to have no or multiple correct answers would have to be corrected regardless when they are identified.

18. NRC validated questions used on previous license examinations at the facility will get limited review. What about questions on similar units?

If it was deemed a satisfactory question by NRC is it "automatically" satisfactory for any facility? (Assuming the question is valid)

The current policy (per Section E of ES-401) is that examiners will review in detail all questions that have not been validated at that facility. Questions previously used on exams at similar units will be reviewed in detail.

19. Administrative-type items are best suited to open-referenced method because of the expectation for these items in the actual job position. However, the written examination, a closed-reference format, has a significant percentage of administrative questions. This appears contradictory.

10 CFR 55.41(a) and 55.43(a) require the written examinations for operators and senior operators to sample a number of administrative topics. Per ES-401 of NUREG-1021, such questions make up approximately 13 percent of the RO examination and 28 percent of the SRO examination. The administrative questions that are used on the written exam should generally be answerable based on recall and/or recognition. As discussed in Section D.2.g of ES-401, under certain conditions, selected reference materials may be provided to the applicants as attachments to the written examination.

20. How large must the exam bank be before you can select 50 questions from it for use on an exam?

Is there a bank size limitation for use of 50 questions?

How can facilities maximize use of bank question (up to 50) if they don't fit the sample plan? Recommend systematically selecting the first 50 questions from bank, then systematically selecting remaining K/As to complete outlines. Could also select 40 questions from bank systematically for modification.

The NRC is not controlling the size of examination banks. The limits on bank use in Section D.2.f of ES-401 apply to every facility licensee, regardless of its bank size. However, from a practical standpoint, the larger the licensee's bank is, the more questions will match the systematically and randomly selected sample plan, and the fewer questions the licensee will have to modify or develop. The national examination question bank being maintained by the

Institute of Nuclear Power Operations should greatly enhance licensees' ability to find bank questions that fit their systematically developed sample plans. Recommendations noted.

21. We are allowed to use 50 questions from the exam bank (including 25% exact repeats from the last two exams and quizzes), 40 modified questions, and 10 new questions.

In theory we would only need to write 10 new questions. This reduces burden for the exam writer, and reduces difficulty on the student. In reality, students generally are exposed to the entire exam bank during the program so the "50" becomes 25. Also, with the lottery (systematic-random) method of choosing K/As, the likelihood of having more than a handful of repeat or modified questions.

Recommend allowing exam writers to randomly select the 25 repeats and 40+ for modification by pulling questions randomly from all questions asked of the students during the program.

Comment and recommendation noted.

The NRC has made no effort to control the size of licensees' examination banks, nor does it control the number of quizzes or questions asked of the students during their training program. The proposed solution would certainly make it easier to prepare an examination, but it would also be a disincentive for licensees to ask any more than 65 questions during the training program.

The changes implemented with Supplement 1 to Revision 8 (refer to Section D of ES-401 in NUREG-1021) raised the upper limit on the number of questions on an exam that can be taken directly from an examination bank from 50 to 75 percent. However, because only those questions that fit the systematic and randomly generated sample plan can be used on the examination, the practical limit on bank use is, for the time being, determined by the size of the bank from which the questions are drawn. Although facility licensees may have to develop more new and modified questions in the short term, the burden should decrease as the local and national examination banks grow is size.

22. Regarding ES-401, Section D.2.f, does a bank question that the students saw during their training program but is then modified (as defined in the standard) count against the 25 questions that can be reused from the last two NRC exams and training quizzes?

Supplement 1 to Revision 8 of ES-401 (Section D) eliminated the limits on repeating questions from previous quizzes and NRC examinations based on the random selection of specific K/A statements and strict adherence to the intent of the selected statements.

23. If a question is used at a different facility (IP2/IP3) what or where does this fall into the 50/40/10?

For questions taken from a non-facility specific exam bank (e.g., the national exam bank) the questions must be changed as appropriate to make them correct for the facility. In this situation, the question may be different than the original bank question, but may not

meet the criteria to be a "modified question" and are also not "new". What should these questions be called and how should they be categorized on the ES-401-6 form?

In accordance with Section C.1.h of ES-201 (in NUREG-1021), a question that was obtained from another facility or the national exam bank and simply tailored or adapted to meet the specifications and terminology of your facility would be treated as a "bank" question. However, in accordance with Section D.2.f of ES-401, if you take a bank question and modify it (beyond terminology changes) by (1) changing one or more of the conditions in the stem and (2) changing at least one distractor such that you have created a similar, but like kind item, then you can properly categorize it as a "modified" question. "New" questions, on the other hand, do not have their basis from an existing bank question. Rather, they have been developed from the author's "fresh start" and, as such, are categorized as "new." Note that the nominal question distribution criteria in ES-401 have changed from 50/40/10 to 75/15/10 percent.

24. If a bank is 100% pre-approved NRC exam questions and the utility modified these to make them site-specific by changing the stem or distractors, can the utility mark them as 100% modified?

The NRC considers all banks to be open and available for study by the license applicants. Therefore, the questions can only be classified as modified for purposes of an NRC licensing examination if the modified versions are kept out of the bank until after they are used on an examination. They would only show up on an examination if they match a knowledge or ability that is part of the systematically developed sample plan.

25. At what point does a "modified" question become a "new" question?

When has a written question been changed enough to be qualified as a NEW question on the written initial exam?

Can we clarify the definition of a "significantly modified" question?

A modified question tests the same content topic as the original question but significantly alters the technical elements in the question (as discussed in Section D.2.f (last bullet) of ES-401) and gives it a different appearance. The intent of the modification is to preserve the focus and topic (i.e., the K/A reference) of the original question. If the question is created without reference to a bank question and has not been previously exposed at the facility, then it can be considered a "new" question.

Note that changing the conditions in the stem such that one of the three distractors in the original question becomes the correct answer would also be considered a significant modification.

26. Can the NRC provide examples of "significantly modified," and "psychometric flaw," questions in an attachment to NUREG-1021?

Appendix B of NUREG-1021 already contains a number of example questions that illustrate psychometric flaws commonly seen on NRC examinations. The NRC encourages the use of

industry-sponsored item-writing workshops as a venue for obtaining and sharing this type of information.

27. With a National Exam Bank, how should utilities address number of questions from bank, modified, or new?

If [the Institute of Nuclear Power Operations] INPO creates a national initial licensed operator exam bank, will the NRC consider the INPO bank to be current questions that cannot be used as new questions on the exam to be developed?

If INPO develops/maintains a national exam bank, what will be the limitations associated with this bank? i.e., will exams still be subject to the 50/40/10 criteria? If so, can 50% of the questions come from the bank? Current NUREG-1021 guidance allows NRC review for "obvious flaws" for exam questions used on NRC exams since October 1995, "at that facility." How will this affect NRC review of exam questions that are part of the national exam bank used at other facilities? What type of security restrictions will be placed on the bank?

Is there a current effort to share "opened and published" exam banks between utilities? If not, who would be interested in this?

On Form ES-401-6, it is required to categorize questions as to the number questions from the bank, modified, or new. For questions taken from a non-facility specific exam bank (the INPO bank for example) the questions must be changed as appropriate to make them correct for the facility. In this situation, the question may be different than the original bank question, but may not meet the criteria to be a "modified question" and are also not "new." What should these questions be called and how should they be categorized on the ES-401-6 form?

The NRC reassessed its policies regarding bank use based on the results of the Revision 8, Supplement 1 trial examinations. In accordance with Section C.1.h of ES-201, questions obtained from any bank will now be treated as "bank" questions. However, only those bank questions that are previously validated at that facility will be eligible for reduced review by the NRC. In accordance with Section D of ES-401 the upper limit on the number of questions on an exam that can be taken directly from an examination bank has been raised from 50 to 75 percent.

Other than the National Examination Bank being developed by INPO, the NRC is not aware of any utility initiatives to share banks. The regional training organizations, owners' groups, Nuclear Energy Institute, and INPO might be able to provide more information in this area.

The use of an INPO bank item - by tailoring or adapting the item to meet the technical specifications of your utility for examination use - is an acceptable and appropriate step toward meeting both technical and psychometric validity. As such, this kind of bank item adaptation results in an item that remains a BANK item and should be categorized as a BANK item. In this instance, you have not MODIFIED the item, as per the definition (ES-401, Section D.2.f), nor can you consider it to be NEW since it has been drawn from the INPO bank. The difference lies

in the degree of change you make to the bank item. We expect utilities to make some adaptations to BANK questions so as to fit the logical terminology (stem and distractors) for its own utility. In such cases, you still have a BANK item. However, if you use a bank item and modify it (beyond nomenclature changes) by (1) changing one or more of the conditions in the stem and (2) changing at least one distractor such that you have created a similar, but like kind item, then you can properly categorize it as a MODIFIED item. NEW items, on the other hand, do not have their basis from a drawn bank test item. Rather, they have been developed from the author's "fresh start" and, as such, are categorized as NEW.

28. In light of the NRC's new goals of reducing unnecessary regulatory burden and increasing efficiency and effectiveness, would it be possible to allow a licensee to build an initial license exam entirely from the bank (rather than 50% new questions), assuming the bank was an appropriate size and security concerns could be solved?

The NRC continues to believe that every examination should have some new and/or modified questions. Based on the results of the Revision 8, Supplement 1 (of NUREG-1021) trial examinations, the NRC staff raised the upper limit on bank questions to 75 percent, with the remaining questions being either new (at least 10) or modified bank questions (refer to Section D.2.f of ES-401). However, because only those questions that fit the systematic and randomly generated sample plan can be used on the examination, the practical limit on bank use is, for the time being, determined by the size of the bank from which the questions are drawn. Although facility licensees may have to develop more new and modified questions in the short term, the burden should decrease as the local and national examination banks grow is size.

29. Regarding ES-401. How do you assure that the extra 10 CFR 55.43 topics are covered in a "representative sample" in the test outline?

The SRO-only examination outlines sample only those K/A categories that are linked to 10 CFR 55.43(b), including a number of the generic K/As in Section 2 of the catalogs and all of the Category A2, AA2, and EA2 K/A statements. All the K/A categories related to the fuel handling facilities are also subject to sampling because that system is specifically identified in 55.43(b)(7). As stated in Section D of ES-401, the specific topics to be sampled on the examination shall be systematically selected.

Operator Licensing Program Feedback

30. Regarding ES-401, Section D.2.d: Cannot write SRO only questions for all seven items listed under 55.43(b). Only three items lend themselves to SRO only type questions. Need multiple examples and training for writing SRO only questions for all seven items.

Comment noted. The operator licensing program office is looking into the quality and consistency of SRO-only questions and may develop additional guidance in this area. This is also a good topic for discussion during NRC and industry item-writing workshops, which the NRC will support to the extent possible.

31. If an instructor has used bank questions, is there a restriction from using them on an examination?

Yes. Although Supplement 1 to Revision 8 of ES-401 (in NUREG-1021) eliminated the limits on repeating questions from previous training quizzes and NRC examinations, the facility licensee still has to take measures to ensure that the final audit or screening examination and any quizzes that are given after beginning work on the licensing exam do not compromise the integrity of the licensing exam. Refer to Section C.1.f of ES-401 for examples of acceptable control measures.

32. When an instructor writes questions, are they no longer allowed to use them?

If an instructor writes a question with the intent of using it as a new question on the next NRC examination, then it can not be used. If an instructor simply writes questions for the bank, they would be treated as any other bank item and can be used on other examinations. Theoretically, all the questions in the bank should have an equal probability of being selected for the NRC exam. They would be counted as bank items and would be subject to the other criteria in NUREG-1021 (e.g., repetition from the audit exam).

33. Does the licensee need to supply names, positions, etc. of validation team prior to using them to review the exam? From ES-401, Section E.4, regarding certain individuals for exam validation: What is a "supervisor or co-worker?" This could be any licensed operator.

Section E.4 of ES-401 discourages facility licensees from using certain individuals to validate the written examination. The applicants' supervisors and coworkers may not be the most appropriate to use for exam validation because it would raise concerns regarding the potential for examination compromise. Moreover, in accordance with Section D.2.b of ES-201, individuals having knowledge of the examination contents are prohibited from performing a number of activities, including all on-the-job training, practice, coaching, and sign-offs. Although licensees are not required to obtain NRC concurrence before placing personnel on the security agreement, it would be prudent to assess the security risk and discuss any questions with the NRC chief examiner. The supervisor/coworker connection would be of most concern for ROs seeking to upgrade their licenses.

34. For 5 hour exams, do the exams need to be time validated for 5 hours (i.e., does the exam have to be made more difficult because the time has been extended?)

No. The exams do not have to be made more difficult. Section D.2.c of ES-401 indicates that the examination should be designed so that competent applicants can take and review it within four hours, the same as before. Moreover, Section D.4.d of ES-402 has been revised to increase the nominal time limit for the RO exam to 6 hours in order to reduce the need for interaction with the NRC regarding minor time extensions and to ensure that the applicants are not time-limited when taking the exam.

35. Certain "newer" K/As have a 10 CFR 55 reference given in parenthesis to show a tie between the CFR and NUREG-1122(3). We were told that questions did not meet the criteria of SRO only (those 25 questions only on the SRO written) if the K/A reference included both 55.41 and 55.43. It is our understanding that questions need be written at SRO knowledge level in these situations. We do not think that this dual CFR reference should be interpreted to eliminate the K/A from being selected for an SRO question.

On a related subject. Please note that the only K/As in the Radiation Control (2.3) Section of the Generic K/As, that list the .41 reference [and] have importance factors of greater than or equal to 2.5 are 2.3.1 and 2.3.2. This predicts RO written exam content and makes JPM selection a bit of a stretch should this 10 CFR 55 reference in K/As have continued significance.

The policy regarding the 25 SRO-only questions on the written examination is stated in Section D.2.d of ES-401. The fact that a K/A is linked to both 55.41 and 55.43 does not mean that the K/A cannot be used to develop an SRO-only question. Questions related to 55.41 topics may be appropriate SRO-level questions if they evaluate knowledge and abilities at a level that is unique to the SRO job position as determined by the facility licensee's learning objectives. Although your observation is valid, please note that NUREG-1021 contains provisions for facility licensees to add, substitute, or delete specific K/As on a case-by-case basis and to use K/As having importance ratings below 2.5 if it is justified based on plant-specific learning objectives. Consequently, the RO written exam content in the radiation control area is not necessarily limited to K/As 2.3.1 and 2.3.2.

When the NRC revised NUREGs-1122 and -1123 to incorporate cross-references to specific items in 10 CFR 55, the primary purpose was to establish at least one regulatory connection for every K/A. The fact that a particular K/A does not reference 55.41 or 55.43 does not, in and of itself, disqualify the K/A from testing on the RO or SRO written examination.

36. According to ES-401, the 25 "SRO-level" questions on the written examination shall be derived from the seven areas in 10 CFR 55.43. However, this guidance is sometimes being misinterpreted such that questions testing 10 CFR 55.43 topics are being rejected as "SRO-level" if the facility licensee also expects ROs to possess the same 10 CFR 55.43 knowledge. Is it correct to say that an "SRO-level" question is simply different from the questions on the RO examination and related to one of the seven items listed in 10 CFR 55.43 (b)?

The fact that a facility licensee expects its ROs to master certain 10 CFR 55.43 knowledge, skills, and abilities does not mean that they can no longer be used as the basis for "SRO-level" questions. However, ES-401 also requires questions to be "appropriate for the job level being examined." Therefore, "SRO-level" questions need to be carefully constructed to ensure that they accurately test the additional knowledge and abilities required for the higher license level according to 10 CFR 55.43(b). For example, both 10 CFR 55.41(b)(10) and 55.43(b)(5) require emergency operating procedure (EOP) knowledge, but the latter requires the "SRO-level" questions to evaluate the additional knowledge and abilities necessary for "assessment of facility conditions and selection of appropriate procedures during ... emergency situations." Questions that evaluate the knowledge of specific bases for EOPs and/or the operational implications of EOP cautions, but not the higher level "assessment and selection" knowledge, would generally not be valid "SRO-level" questions because they are applicable only to 10 CFR 55.41(b)(10) according to K/A numbers 2.4.18 and 2.4.20 of NUREGs-1122 and -1123. However, questions that evaluate K/A number 2.4.21 (knowledge of the parameters and logic used to assess the status of EOP safety functions) would generally be considered valid "SRO-level" questions even if the facility licensee's SAT-based program has identified this additional 10 CFR 55.43(b)(5) knowledge as an RO job requirement. Consequently, questions that test knowledge and abilities per 10 CFR 55.43(b) can be considered "SRO-level" per Section D.2.d of ES-401 even though the facility licensee's training program requires the same level of knowledge for its ROs.

37. ES-401 does not address using a K/A that references 10 CFR 55.43 for testing on the RO written examination; is that acceptable?

Yes, it is. 10 CFR 55.41(a) states that "the knowledge, skills, and abilities [to be tested on the RO written examination] will be identified, in part, from learning objectives derived from a systematic analysis of licensed operator duties performed by each facility licensee and contained in its training program." Although ES-401 does not specifically address using a K/A linked to 10 CFR 55.43 to develop an RO written examination question, it does allow the facility licensee to use plant-specific priorities (and a site-specific task list) to justify using an otherwise unimportant K/A for questioning. Therefore, questions associated with topics in 10 CFR 55.43(b) should be acceptable for the RO examination if they are supported by documented RO learning objectives derived from the RO job task analysis at the site.

38. Why are we testing abilities and/or skills on the written exam vs. on the simulator exam (via K/A [knowledge and abilities] catalog)? Shouldn't we test knowledge on the written exam and abilities on the operational portion of the exam?

This question suggests that there is a dichotomy between knowledge and skill testing, when, in fact, knowledge and skill are interrelated, and testing in one format does not preclude assessing understanding in the other format. Although skills and abilities testing is more commonly associated with JPMs and simulator scenarios, it is incorrect to assume that they cannot be tested on the written examination.

Good test items, whether part of a written examination, walk-through, or simulator scenario, should be operationally valid. You should not assume that written questions are passive items where only facts, principles, or concepts are recognized. Ideally, they should assess the

applicants' ability to integrate and use information on plant conditions. For example, such questions could require the applicant to use information in the stem of the question to determine appropriate actions or predict system responses. These "scenario style" questions are dynamic in nature, requiring the applicant to sort, merge and integrate contrived, but possible conditions. They assess at the application level of operator action -- a quality consistent with Bloom's Taxonomy (see Appendix A and B of NUREG-1021) and the goal of attaining high operational validity. To this extent, operator knowledge and skill are simultaneously embedded within the written test questions.

When it is not possible to test a randomly-selected skill or ability on the written examination, then another K/A should be randomly selected. However, as stated in Section D.1.b of ES-401, the facility licensee shall provide written justification for replacing any randomly selected K/A.

39. What would it take to go back to (pre-revision 8) a site-specific K/A [knowledge and abilities] catalog in line with the SAT-based [systems approach to training] process?

Before Revision 8 of NUREG-1021, when the NRC and its contractors prepared all of the licensing examinations, the NRC determined what K/As would be tested. The NRC generally used NUREG-1122 or -1123 (which are based on a generic job task analysis performed by the Institute of Nuclear Power Operations with importance ratings established by a panel of industry and NRC subject matter experts) to ensure that the examinations were content-valid, but site-specific catalogs were permitted on a case-by-case basis. Now that facility licensees are preparing most of the examinations and determining what K/As will be tested, the NRC believes that certain measures are necessary to ensure that consistency and public confidence are maintained. The NRC staff believes that it would be inappropriate to give licensees complete control over the content of the training program as well as the licensing examinations. As explained in response to FAQ #12, NUREG-1021 contains provisions for facility licensees to add, substitute, or delete specific K/A requirements on a case-by-case basis if they are justified and agreed to by the NRC chief examiner.

40. Why does a group with only 1 or 2 safety-significant K/A's [knowledge and abilities] have as much weight as one with 200? Can [NUREG-]1021 be changed to remove this artificiality?

The NUREG-1021 superstructure forces you to sample the systems K/A of about the same rate (1 or 2) per system. However, some systems have 5 K/As that are above 2.5 and some have 200. This forces you to over-sample some systems and under-sample others. Can the superstructure be realigned to eliminate this problem by lumping all the system K/As together and selecting the number needed from the total?

The relative safety-significance of the plant systems and emergency/abnormal plant evolutions (E/APEs) was considered by the team of industry and NRC subject matter experts that originally designed the 3-tiered written examination sample plan (as part of NUREG/BR-0122 "Examiners' Handbook for Developing Operator Licensing Written Examinations") that is still in use in ES-401 of NUREG-1021. For example, Tier 1 of the PWR RO sample plan is broken down into two groups of E/APEs that make up 24and 12 percent of the exam, but include 22 and 34 items,

respectively. The more important items that are included in Group 1 are weighted much more heavily than the items of lesser safety significance that are included in Group 2.

If all the K/As were lumped together, some of the stratified system categories that presently exist could go unsampled. This would bias the exam and reduce the number of areas tested and reduce exam validity. Moreover, the strict guidance of ES-401 helps to make exams more uniform between the different groups that develop them. Examinations should differ only in the specific content covered, not in their development process, manner of sampling, item construction criteria, level of item bank use, or their levels of knowledge and difficulty.

41. Do practice exams late in the program have to be accounted for in the exam overlap restrictions?

That depends on whether they are developed before or after the facility licensee begins working on the licensing examination. Although NUREG-1021 has eliminated the restrictions on repeating questions from training quizzes and the past two licensing examinations, the facility licensee must still take measures to ensure that the audit exam and any other quizzes developed after starting work on the licensing exam do not compromise the integrity of the exam. Section C.1.f of ES-401 provides examples of acceptable control measures.

42. Why is it valid to use a closed reference exam for initial license exams when it is really important that the operator use all of the tools available to him on shift? Where is the NRC headed on the use of open-reference requalification questions on initial exams?

Open-reference items on the initial license examination should be used judiciously and sparingly because the examination should focus on the broader content areas that rely primarily upon learned information, committed to memory.

In nearly every field of study (e.g., medicine, law, and education), the testing required for initial licensing or certification is more demanding than that required to maintain certification. The rationale is that newly licensed personnel should possess a broad body of knowledge and ability to perform their job independently and without the aid of supplemental knowledge contained in procedures. This by no means suggests that procedures should not be used, but rather that initial license testing should emphasize those areas where procedures need not be used.

Through their training, operators must learn set points, immediate actions, system designs and interrelationships, administrative procedures, and applications of knowledge to the job. The knowledge that is learned is expected to be demonstrated through the NRC examination format that measures recognition and recall of safety-significant knowledge without relying on references. This approach is consistent with the timely retrieval of information that may be required during the licensed operators' job and that might otherwise not be possible if the applicants prepared only for open-reference examinations. If too many open-reference questions are allowed on the initial licensing examination, the need and ability to learn and retrieve a broad body of knowledge would be lessened. Similarly, the confidence that the baseline body of knowledge had been truly established could be questioned.

Once initial competency is assured, then ongoing training and testing, which is more review-like, focused and specialized in nature, can make more appropriate use of the open-reference format, as is done on requalification examinations. However, for the reasons stated above, the NRC does not plan to increase the limited and judicious use of open-reference questions on the initial license examination.

43. Can 25 questions from the previous 2 NRC exams be used if randomly generated without modification?

Yes. However, in accordance with Section D.1.b of ES-401 (in NUREG-1021), the specific K/A statements (e.g., K1.03 or A2.11) for the examination outline must be selected in a truly random fashion (as verified by the NRC chief examiner) and the questions selected to implement the outline must clearly match the intent of the selected K/A statements (which will be verified on a sampling basis by the NRC chief examiner).

Given the number of K/A statements in the testable population, the NRC staff believes that it is extremely unlikely that a random selection process would result in that many duplicate questions. Per Item 4 on Form ES-401-6, the NRC will review the facility licensee's sampling process to ensure that it was random and systematic if more than 4 RO and 2 SRO-only questions are repeated from the last two NRC licensing exams.

44. With a completely random process, the generic K/As tend to get over-sampled (about 30%) on the written exam. Since the administrative section of the operating test is all generics, they tend to get way over-sampled. Can the generics be eliminated from the plant systems and emergency/abnormal plant evolutions (E/APE) tiers?

Revision 0 of the NRC's K/A Catalogs (NUREGs-1122 and -1123) included a list of system-generic K/As at the end of every system and E/APE. Those K/As were sampled as part of Tiers 1 (E/APEs) and 2 (plant systems) of the examination. When the NRC revised the K/A Catalogs, the system-generic K/As were subsumed in Section 2, "Generic Knowledges and Abilities," but there was no intent to change the distribution of questions among the three tiers of the exam. Consequently, the guidance in Section D.1.b of ES-401 indicates that only those generic topics that are relevant to the selected evolution or system will be included in the sample for Tiers 1 and 2. Section D.2.a of ES-401 further clarifies that the questions selected for Tier 3 shall maintain their focus on plant-wide generic knowledge and abilities and not become an extension of Tier 2, "Plant Systems." If none of the generic K/As were testable in Tiers 1 and 2, it would not be possible to ask a system-specific technical specification question.

45. Is the following scenario acceptable for purpose of controlling any overlap from the audit to the NRC exam? 1. Audit exam is last year's NRC exam. It was developed using randomly generated sample plan 1 year ago. 2. NRC exam is developed using randomly generated sample plan. Some overlap occurs in K/As tested on the audit and the NRC exam.

Yes. Since both examinations were randomly generated and presumably the questions match the selected K/As, it is acceptable. Some overlap may occur.

46. For a written retake exam, the subsequent audit exam focuses somewhat on identified weaknesses from the previous NRC exam. Therefore, the audit exam is not totally random. Is this acceptable?

How do we apply the audit/screening exam criteria for written re-exam efforts? Does an upgrade [remedial] program [for the applicant] exam count as an audit? Since 60 days have elapsed, does the initial audit exam fall into the "bank" question category?

ES-401 of NUREG-1021, Section C.1.f, discusses acceptable methods for ensuring that the audit exam does not compromise the licensing exam. The example given would be acceptable if the audit exam is finalized before the NRC exam development is started or if there is no duplication between the audit and the NRC exam. As long as the NRC licensing examination is developed using the random and systematic process described in ES-401, there are no restrictions on repeating questions from any prior examinations and quizzes, including old audit and licensing exams. Once an audit or any other exam is given, all the questions on that exam would be considered "bank" questions that could be used to evaluate the associated K/A if it is randomly selected for a subsequent examination. However, the content of any practice or audit exam or quiz that the facility licensee develops after it starts working on an NRC licensing examination would have to be controlled to protect the integrity of the licensing exam.

47. Has the K/A catalog been reviewed and each K/A evaluated for cognitive level? (Some appear to support only basic Level 1 questioning.)

Are fundamental K/As being eliminated from the K/A catalog? For example: the purpose of charcoal filters in iodine removal systems.

The knowledges and abilities in the NRC's K/A Catalogs (NUREG-1122 and NUREG-1123) have not been reviewed for cognitive level. The K/A catalogs were developed by a group of utility personnel and the NRC and only list knowledge and abilities with importance values related to performing licensed duties. K/As are topical content areas and should not be confused with the cognitive levels of test items; K/A importance values and cognitive level are separate and distinct exam development parameters. The fact that some of the K/As do not support the development of higher cognitive level questions does not make them unusable on the NRC licensing examination because ES-401 specifies that 40 to 50 percent of the RO questions will be written at the fundamental level of knowledge.

48. Is there any movement towards going to 3-part multiple choice questions vs. 4? The 4th distractor is very expensive, most times demanding more time than the others combined.

No, that is not being considered. The four-distractor format is the only one acceptable to the NRC. Refer to NUREG-1021, Appendix B, Section C.2.a.

49. K/A Categories A-3 Monitor Auto operation of ... and A-4 Manually operate ... don't seem to be well tailored to a written exam. These topics for the written exam are almost always covered in K1-6, A1, or A2. Why not eliminate these categories from the NUREG-1021 superstructure since they are more properly tested by the operating test and the knowledge is already sampled by K/As in other categories?

Recommendation noted. However, questions can be written to test the applicants' ability/knowledge of proper automatic operation and how to manually operate a component or system.

50. Is NRC considering allowing the Institute of Nuclear Power Operations (INPO) to oversee the development and administration of the written test?

The Nuclear Energy Institute (NEI) at one time proposed that option for consideration by the NRC staff, but it was determined to be unworkable.

51. Why isn't the Control Room Ventilation System listed as one of the systems in the PWR KA catalog? Was this a deliberate omission? I noticed that Control Room Ventilation is included in the BWR catalog.

The NRC's K/A catalogs, NUREGs-1122 [and 1123], "Knowledge and Abilities Catalog for Nuclear Power Plant Operators: Pressurized [Boiling] Water Reactors," are based on the job/task analysis (JTA) performed on the licensed operator position by the Institute of Nuclear Power Operations (INPO). The INPO JTA identified more than 28,000 knowledge, skills, and abilities (K/As) and nearly 800 tasks to be used as a basis for developing training programs applicable to all PWR and BWR facilities. The K/A catalogs were reviewed by licensed SROs as well as license examiners from the NRC. These experts reviewed each statement for accuracy and completeness and then rated each statement with respect to its importance to safe operation. Many of the INPO K/A statements were omitted from the NRC's K/A catalogs because they were too specific and/or too elementary for use in developing license examinations, or, more importantly, because they had little bearing on the safe operation of the nuclear plant - the job content that is of primary interest to the NRC.

The two K/A catalogs were developed independently and, consequently, had a number of significant differences. The PWR catalog was issued in July 1985, and the BWR catalog was issued in September 1986. Both catalogs were revised in 1995 and again in 1998 to incorporate links to the applicable 10 CFR 55.41-45 item numbers, and to reorganize and/or expand the generic K/A statements, the safety functions and plant systems, and the emergency and abnormal plant evolutions. Revision 1 added the component cooling water and instrument air systems (which were already covered in the PWR catalog) to the BWR catalog; however, no new systems were added to the PWR catalog. Without doing a significant amount of research into the archives, it would be difficult to say for sure whether the inconsistency you have raised was deliberate or coincidental.

As noted above, the K/As in NUREG-1122 and 1123 are but a subset of the total population of K/As that a license applicant needs to master to become a competent operator or senior operator. The fact that a particular K/A or system did not make it from the original INPO JTA into the NRC's K/A catalog does not justify its omission from a facility licensee's systematically-developed operator training program, nor does it mean that the K/A or system is inappropriate for testing on the licensing examination. As indicated in 10 CFR 55.41-45, the K/As covered on the RO and SRO license examinations will be drawn, in part, from learning objectives derived from a systematic analysis of the operators' duties performed by each facility

licensee and contained in its training program. Although the control room ventilation system is not included among the 45 systems in the PWR catalog, K/As related to that system may still be selected for testing in connection with other systems (e.g., area radiation monitoring (ARM) system - K1.04), abnormal plant evolutions (e.g., accidental gaseous radwaste release - AA1.02), and the generic K/As (e.g., 2.1.26 - knowledge of non-nuclear safety procedures such as chlorine). Moreover, note that Revision 9 of ES-401 (in NUREG-1021) requires test developers to add any operationally-important systems or E/APEs that pertain to the facility but are not included in the generic lists on Form ES-401-1 to the examination outline before selecting examination topics.

52. Are technical specification (TS) action statements that require action "within one hour" addressed by NUREG-1123, K/A 2.1.11? We have received different interpretations from different examiners. We believe that they are NOT since action could be taken at the end of sixty minutes and still be within compliance.

Although the "within one hour" TS action statements and K/A 2.1.11 are not identically worded, the TS action statements and the K/A 2.1.11 wording are equivalent in their intent and meaning. It is agreed that action might not be taken or initiated until 60 minutes have elapsed. However, should that be the case, the requisite action or actions must also be completed by the end of 60 minutes. In other words, the knowledge required for the operators to properly complete the required system action statements is the same no matter if completed in 59 or 60 minutes. Therefore, the wording difference noted is not sufficient justification to exclude sampling K/A 2.1.11 should it be selected as a result of the systematic sampling procedures for preparing the written examination and/or operating test outlines according to NUREG-1021. That being said, the testing of K/A 2.1.11 should be both operationally and psychometrically valid, and take into consideration the learning objectives for the knowledge, skills, and abilities necessary for job performance as discussed in 10 CFR 55.41(a), 55.43(a), and 55.45(a), as applicable. Related clarification for valid testing of TS K/As and K/As without a related facility learning objective can be found in the responses to Questions #11 and #12 for ES-401.

Operator Licensing Program Feedback

ES-402
Administering initial written examinations

1. Regarding the written exam duration: The exam duration should be presented to candidates as: "The exam duration is scheduled (targeted) for 5 hours: but extensions can be granted," i.e. don't rush through exam to meet the 5 hour time limit.

What is the interpretation of "prior approval" for extensions of 5 hours for the initial written examination? Why is there a time limit for written exams?

Why not just an upper limit with no extensions? Maybe 7 hours?

Comments noted. The time limit is largely an examination design and resource planning tool, and is not intended to rush the applicants. Some applicants will take whatever time is allowed, which would place an additional burden on facility proctors and NRC examiners who are required to be available by telephone while examinations are being administered.

As noted in Attachment 1 (Section II) of SECY-98-266, the nature of the NRC licensing examination is such that allowing sufficient time to demonstrate knowledge is of primary concern. Section E.4 of ES-401 (in NUREG-1021) encourages facility licensees to conduct a peer review of the examination, which should confirm that the level of difficulty is appropriate and that the applicants will have sufficient time to complete the exam.

As discussed in Section C of ES-402, it is important that the licensee coordinate the administration of the written examination so there will always be an NRC contact available to respond to questions or problems that might arise. Therefore, if the facility licensee determines, while proctoring the exam, that any of the applicants will not be able to complete the examination within the time allotted, the licensee shall contact the NRC Regional Office as discussed in Section D.4.d of ES-402, before granting the extension and, again, after all the applicants have completed the examination. The NRC does not want to discover after the fact that the licensee has given the applicants more than the allotted time to complete the examination. Per Section E.3.a of ES-501, the NRC will document the time extension in the examination report and expect the facility licensee to evaluate whether a problem with the examination validation or the training of the applicants is indicated.

The fact that Supplement 1 to Revision 8 (specifically Section D.4.d of ES-402) extended the nominal time limit for completing the RO exam to six hours, that the examination is designed for four hours (refer to Section D.2.c of ES-401), and that Revision 9 shortened the examination to 75 questions should eliminate the need for time extensions under normal circumstances.

2. Must the facility proctor read the entire Appendix E verbatim or just the first part regarding cheating?

Only those items specifically identified in Appendix E (i.e., Items A.1 and B.1) need to be read verbatim by the proctor; the others may be paraphrased. Per Section D.2.c of ES-402, every applicant shall also be given a copy of the Appendix to review before starting the examination.

Operator Licensing Program Feedback

3. What is the guidance on providing additional information or clarifying statements to the candidates during the written exam? Specifically, for facility written exams.

The requested guidance is located in Section D.3.b of ES-402 (in NUREG-1021); it is the same regardless who prepared the examination. Anyone providing additional information during the examination must be extremely careful not to lead the applicants or give away answers when clarifying questions. If the proctor has any doubt about how to respond to an applicant's question, it is best to withhold additional guidance and instruct the applicant to do his or her best with the information that is provided. Per Section C.2.b of ES-402, an NRC examiner will always be available in the NRC Regional Office to respond to questions while the examinations are in progress.

Operator Licensing Program Feedback

ES-403
Grading initial written examinations

1. Is there a checklist that states make copy prior to grading?

Please add note to Form ES-403-1 for the grader to copy the answer sheets. I would also suggest making two copies, NRC and facility to have. (ES-403, Section D.2.a)

Yes; it is included on Form ES-403-1 (in NUREG-1021). Moreover, Section D.2.a of ES-403 instructs the grader to make a copy before marking the original, and Section C.1.a of ES-501 instructs the facility licensee to submit the clean copy with the examination package. There is no restriction on the licensee keeping copies of the answer sheets.

Operator Licensing Program Feedback

ES-501
Initial post-examination activities
(documentation and reporting)

1. Does the time-line (5 days) for completing the requirements of ES-501, Section C.1.a, begin after completing the written or the entire exam including the operating test? Assuming the time begins after completing the entire exam, how does this factor into the 30-day allowance between the administration of the written and operating tests as described in ES-402, Section C.2.b?

Can the NRC expectation for exam comments be delayed until exam completion for utility-administered examinations?

The purpose of the 5-day time-line is to enable the NRC to achieve its goal of completing the licensing actions within 30 days after the examinations are given. With the exception of the Security Agreements (Form ES-201-3 in NUREG-1021), all of the items listed in Section C.1.a of ES-501 are associated with the written examination. Consequently, those items should be forwarded to the chief examiner as soon as practical (but not necessarily within 5 days) after the written exams were given, even if the operating tests are given at a later date. This will allow the NRC to resolve any comments and review the written examination grading, thereby expediting the completion of the licensing actions after the operating tests are administered.

As always, facility licensees should confirm their specific schedule with the chief examiner. If the personnel who will compile the post examination comments are busy with other exam activities, talk to the chief examiner and arrange an alternate date for submitting the comments. Supplement 1 to Revision 8 of ES-501 clarified the guidance regarding submittal of post-examination comments.

2. ES-501, Section C.1.a (Bullet 4) states that any comments made by the applicant(s) after the written exam with explanations of why the comment was accepted or rejected must* be submitted to the NRC. (* To be consistent with ES-402, Section E.4, this submission should be "optional.")

Do all comments made regarding the written exam by the applicant and a reason for accepting/rejecting the comment need to be submitted (ES-402, Sections E.4 and 5). I was told not to submit student's rejected comments, only those that cause an exam change. This is a "should," can it be changed to only sending in comments requiring an exam change?

ES-402 (Section E) and ES-403 (Section D) encourage facility licensees to collect examination comments from the license applicants and consider them during the initial grading process because this will enhance examination validity. Although licensees are only required to submit comments and documentation to the NRC to justify question deletions and changes in the answer key, it is useful for the NRC to know, if an applicant submits an appeal, that the facility licensee had previously reviewed and rejected the applicant's concern(s). If the facility licensee

wrote the examination, the NRC may request the licensee to state its position regarding the applicant's contentions.

Supplement 1 to Revision 8 of NUREG-1021 changed Section C.1 of ES-501 to make it consistent with ES-402.

3. If the chief examiner conducts a regrade (78-82%), what is the focus of the regrade? (Regrade per the key?) (Validity of the questions?)

Multiple grading changes and reviews often result in answer sheets that are difficult to read and could result in licensing errors. Therefore, Section D.2.c of ES-501 requires the chief examiners to regrade borderline exams using the clean answer sheets copied per Section D.2.a of ES-403. The regrade would be done after all the facility's comments have been resolved and the answer key has been finalized. It would normally not involve a revalidation of the exam questions.

4. Since senior site management tends to "expect perfection," maybe the NRC could communicate that a number of comments are expected (in the final examination report).

Comments contained in reports should remain specific to deviations from 10CFR or NUREG. (State the facts, refrain from the use of "several" or "many.")

When does the clock start for the 20% untestable questions?

Comment noted. The NRC has tried to communicate exactly that message during the operator licensing workshops conducted by each of the NRC Regional Offices.

Supplement 1 to Revision 8 of NUREG-1021 clarified the guidance in Section E.3 of ES-501 regarding the portrayal of examination quality in the final report. It established a 20% unacceptable test item threshold below which the report will simply indicate that the proposed examination was within the expected range of acceptability. This policy has been in effect since the spring of 2000.

5. Is there a format for the utility to provide the NRC with feedback on how the exam went? Sort of a reverse exam report? I would think the NRC would be open to feedback so you can also improve the exam process from your end. (I mean a formal feedback process - not casual.)

NUREG-1021 requires the regional operator licensing branch chiefs to solicit feedback from the licensee before the examinations are given (Section C.2.j of ES-201) and encourages the discussion of lessons learned after the examinations are complete (Section E.1.d of ES-501). As discussed in Section C.1.j of ES-201, facility licensees are encouraged to call the NRC chief examiner, regional branch chief, or program office any time they have concerns regarding an examination.

Operator Licensing Program Feedback

6. If candidates score in the 80-81% range, are licenses held? If so, how long? (No failures)

If there are no written examination failures, there is no reason for the NRC to withhold a license so they would all be issued simultaneously. As discussed in Section D.3.c of ES-501 (in NUREG-1021), the NRC would only hold the license for an applicant that scored between 80% and 82% (70 - 74% on the SRO-only questions) if another applicant failed the examination and there is a possibility that enough of the questions that the passing applicant got correct could be deleted from the examination on appeal or have their answers changed, thereby causing the applicant's score to fall below 80% (70% on the SRO-only questions).

7. Has the NRC considered changes resulting from deregulation with regard to making examinations public?

In accordance with 10 CFR 2.390, all final NRC records and documents will be made available in the NRC's Public Electronic Reading Room unless there is a compelling reason for non-disclosure or the document qualifies for one of the exceptions specified in the regulation. It is the intent of the NRC to automatically make publicly available information that is anticipated to be of interest to the public without anyone having to file a request under the Freedom of Information Act. Without more specific information, it is unclear how the deregulation of the electric power industry would or should affect the NRC's responsibility to keep the public informed regarding its health and safety mission.

Operator Licensing Program Feedback

ES-502
Initial examination appeals and hearings

1. How will the facility representatives get a copy of the NRC appeal correspondence?

It is normal practice for the NRC to send a copy of its appeal correspondence to the individual who signed the applicant's license application (NRC Form 398). However, applicants who file an appeal are not required to send a copy of their request to the facility licensee.

2. Who is responsible for defending a question during the appeal process?

Once the NRC approves an examination it essentially takes ownership of the document. Therefore, if a question is challenged during an appeal, the NRC will take the lead in defending the question. However, as stated in Section C.2 of ES-502 (in NUREG-1021), facility licensees are expected to provide reference material and technical support (and possibly confirmation of the test item's validity if the facility wrote the examination) as necessary for the NRC to evaluate and resolve any concerns raised by a license applicant.

3. What would the NRC do if a question from the national exam bank was found unacceptable after it was used? How far back would the NRC search for previous use of the question, which could affect already issued licenses?

Any question (not just those from the national bank) determined to be invalid during the grading process (i.e., after the exam was given but before the licenses are issued) would be deleted from the exam and the applicants' grades would be adjusted accordingly. However, this would not affect applicants who had already been granted a license.

4. In accordance with ES-502, Section D.2.C, if an applicant's license examination failure is overturned due to appeal and the question that was reviewed affects the licenses of other applicants, will licenses be granted to all applicants that would have received a passing grade due to the review, even if those applicants chose not to appeal?

Yes. The NRC regional office will determine if any of the test item changes (i.e., question deletions or answer key changes) made as a result of the NRR operator licensing program office review for the appealing applicant(s) alter the outcome for any applicant who failed the examination but chose not to request an administrative review or hearing. If the test item changes cause any of the non-appealing applicant(s) to achieve a passing score, the regional office will issue licenses, as appropriate.

Operator Licensing Program Feedback

ES-601
NRC requalification examination process

1. 2.5 versus 3.0. What is the minimum task [importance] threshold for initial exams versus requalification? Should be higher standard for requal than initial.

As noted in Attachment 3 of ES-601 (in NUREG-1021), all test items used on an NRC requalification examination should normally have a K/A importance rating of 3 or greater. The minimum K/A importance rating for initial exams is 2.5. In either case, test items with lower NRC K/A values may be used with appropriate justification.

The NRC expects facility licensees to comply with their own requalification program requirements regarding test item importance.

Initial license applicants are held to a higher standard (i.e., more K/As eligible for testing) because the NRC has no prior basis for judging their competence. Once an operator has a license, his/her competence is continually evaluated on the job and in requalification training, thereby justifying a lower threshold for the NRC requalification examination.

2. Is there a policy for use of computers and maintaining exam security?

Does there need to be a specific procedure for requalification examination security?

The requirements of 10 CFR 55.49 apply to all examinations required by the regulation, including requalification exams, while the requirement to establish, implement, and maintain examination integrity and security procedures in accordance with 10 CFR 55.40(b)(2) only applies to power reactor licensees that elect to prepare their own initial operator licensing examinations. However, it would be appropriate for those licensees that do establish procedures to address all exams required by Part 55. Refer to the section on ES-201 for related security questions.

3. What is the basis for the statement [in Section E.1.b of ES-601], "Under NO circumstances will another operator be allowed to witness an operating test?" There are instances where the crew being examined may want another operator to observe. (e.g., We had an initial license exam during the annual operating test. When the initial license candidate completed his exam and was assigned to a crew, the crew's shift manager requested that the new crew member be able to observe their operating test from the simulator instructor's booth.)

The bases for this policy include the desire to minimize undue stress on the operators (or applicants) that are being evaluated and the need to minimize crowding in the simulator (for the examinees, NRC examiners, facility evaluators, operations and training representatives, and simulator operators that have to be there). Moreover, the NRC believes it is inappropriate to use NRC-conducted licensing and requalification examinations as training tools for other applicants and operators. Facility licensees are free to establish their own examination policies for requalification examinations in which the NRC is not involved.

Operator Licensing Program Feedback

ES-602
NRC requalification written examinations

1. Why [is there a] static [written exam] if [the] NRC administers requalification? What value [is] added?

Static Exams - If [the] NRC administers [a] requal exam, a static is required. If we administer our own, a static is not required. Some utilities have stopped maintaining a static exam bank and use of it, while others (such as us) are continuing to use them. The reason we do is, if NRC comes into a program that hasn't done statics for a long time, and the crews are subjected to statics, and they aren't used to them, a high failure is likely. So, why does this difference exist?

Why is there a difference between what the NRC would do for a "for cause" requalification [exam] versus facility requalification [exam]? [This is] unfair [to the operators and may lead to a] high failure rate.

The requalification examination format, including the static written examination, was developed by an NRC/industry working group in 1987. The NRC understands that most facility licensees have stopped using the static written format since the NRC shifted to an inspection-based oversight program in 1994, and the fact that it is still included in the ES-600 series of NUREG-1021 has prompted some facility licensees to continue using it as well or at least to maintain their static scenario banks. As discussed in Section C of ES-601, if a facility licensee's requalification program uses an examination structure or methodology different from that described in the ES-600 series and the NRC decides to conduct an examination, the NRC will consider preferentially using the facility licensee's requalification examination structure or methodology if it is different from that described in the ES, provided it complies with 10 CFR 55.59 and is free of significant flaws; the regional office shall consult with the NRR operator licensing program office to determine the appropriate examination procedure.

2. What is the policy/requirement regarding extension of time limit for the requalification written exam? ES-401 allows time extensions. Does the ES-600 series? Are time extensions for requalification exams similar to [the initial] written?

Although the examination should be time-validated to preclude the need for extensions, the NRC would consider extending the time limit for NRC-conducted requalification examinations, as it does for initial licensing examinations. When facility licensees conduct their own requalification examinations, the NRC expects them to comply with their program requirements (including the ES-600 series, as written, if the licensee has endorsed the ES as part of its program).

3. What is an effective sample plan generation?

The concept of examination sample plans is discussed in Attachment 3 of ES-601. If that does not provide the information you need, please submit a more specific question.

Operator Licensing Program Feedback

4. If the yearly requal exam is randomly and systematically developed, can we eliminate the 50% overlap restriction that currently exists?

Although there is no official 50% overlap restriction (refer to Section E.3.b(6) of ES-601 of NUREG-1021), the random and systematic development of requalification exams would eliminate the NRC's concerns regarding exam integrity and validity. Moreover, assuming that a facility has a reasonably sized examination question bank, it would be highly improbable that a 50% overlap would occur under a random and systematic selection process.

Operator Licensing Program Feedback

ES-603
NRC requalification walk-through tests

1. Section B of ES-301 states that initial license exams should sample the items listed in 10 CFR 55.43 but need not cover all 13 items. Is this also true of a requalification annual operating examinations?

Is there an expectation that every SRO do an Emergency Plan classification in either a scenario or a JPM?

Yes. As specified in 10 CFR 55.59(a)(2)(ii), the operating test shall cover a comprehensive (i.e., thorough or broad, but not necessarily complete) sample of the items specified in 10 CFR 55.45(a)(2) through (13) as applicable to the facility. Also refer to FAQ #13 under IP-71111.11.

No. Every operating test is a sample and does not have to include an Emergency Plan classification.

2. Is changing a JPM to an alternate path JPM considered a different test item (for the 50% [repetition] requirement)?

Yes. This is consistent with the initial examination policy regarding the repetition of test items from the individual's audit examination (refer to Section D.1.a of ES-301 of NUREG-1021).

3. Are simultaneous JPMs allowed?

The NRC would allow the simultaneous administration of JPMs in the simulator or control room during NRC-conducted tests provided there is no interference between the operating stations. When licensees are conducting the tests, they should follow their approved requalification program.

4. To what extent is it acceptable to just mark up a procedure versus [following] the ES format [for JPMs]?

In accordance with Section C.1.d of ES-603, Form ES-C-1, "Job Performance Measure Worksheet," or an equivalent facility form should be used to construct and format the JPMs. However, as long as the JPMs include the elements identified in Appendix C (e.g., initiating and terminating cues, critical steps, and performance criteria), it should be possible to adapt facility procedures for use as JPMs by identifying critical steps and entering comments on how to execute particular steps. Section D.2.b of ES-301 authorizes that practice for initial operating tests.

Operator Licensing Program Feedback

5. Is the initial licensing walk-through alternate path JPM requirement, a required item for annual requalification exams?

No. However, per ES-601 of NUREG-1021 (Section III.C of Form ES-601-2), facility licensees are expected to include some alternate path JPMs in their test item banks for use during NRC-conducted requalification examinations.

6. ES-603 guidance for generating an annual operating evaluation states the sample plan is to be based on the "current" cycle. My question is this; suppose we are in the first six months of the "current" cycle and we want to generate an annual operating exam, since there is insufficient material for an exam would it be acceptable to generate the exam based on a sample plan developed covering the "current" cycle and include that part of the previous cycle up to the last exam (i.e. the last six months of the previous cycle)?

Keep in mind that the ES-600 series in NUREG-1021, "Operator Licensing Examination Standards for Power Reactors," provide guidance for the preparation and administration of licensed operator requalification examinations in which the NRC is an active participant. When facility licensees prepare and administer their own requalification examinations, the NRC does not expect or require them to comply with the guidance in the ES-600 series unless the facility licensee has formally incorporated that guidance as part of its accredited (by the National Academy for Nuclear Training) training program.

Although requalification programs that are based on a systematic approach to training (SAT) should evaluate the trainees' mastery of the objectives during training, Attachment 3 of ES-601 encourages reserving a portion of the examination to test high importance topics that were not necessarily covered during the requalification cycle. This is consistent with 10 CFR 55.59(c)(4)(i) which (in lieu of a SAT-based program) requires the comprehensive written exams and annual operating tests to determine areas in which retraining is needed. Moreover, 10 CFR 55.59(a)(2)(ii) requires the operating test to evaluate the operators' understanding of and ability to perform the actions necessary to accomplish a comprehensive sample of the items specified in 55.45(a)(2) through (13) inclusive to the extent applicable to the facility.

Notwithstanding the liberal definition of "annual" in Appendix F of NUREG-1021, we encourage facility licensees to conduct their annual operating tests at approximate 12-month intervals (i.e., at the midpoint and end of their 24 month requalification training cycles). Facility licensees need to exercise caution when they reschedule examinations around the plant's operating schedule to ensure they comply with the regulation by doing an operating test every calendar year.

Bottom line: The NRC expects facility licensees to comply with the requirements in 10 CFR 55.59 and their accredited training programs. The regulations do not appear to prohibit the use of test items covering topics outside the scope of the current requalification training cycle. You need to check to see what the facility licensee's program requires.

Operator Licensing Program Feedback

ES-604
NRC requalification dynamic simulator tests

1. For requalification [examinations, do you] test how you normally staff?

Yes. As stated in Section D.2.a of ES-601 (in NUREG-1021), the NRC expects facility licensees to train and examine their operators in the same crew configurations with which they normally operate the plant.

2. Can an individual who fails in the simulator for a specific task be retested with a JPM, or must it be a scenario?

If an operator fails an annual operating exam scenario due to an independently performed competency, can a JPM be used as a retake exam?

If an operator fails any portion of an NRC-conducted operating test (initial or requalification), the retest will be in the same format as the part that was failed. If an operator fails a facility-conducted requalification examination, the facility licensee would be expected to administer the retest in accordance with its approved requalification program.

3. Can an individual failure [on the simulator operating test] be retested with surrogates, or must it be with a shift?

Surrogates would be acceptable for an NRC-conducted test, but the facility licensee would have to follow its program requirements if it conducts the test.

Operator Licensing Program Feedback

ES-605
License maintenance/conditions; renewals; requalification; appeals and hearings

1. NUREG-1021 allows postponement of requalification requirements for up to 2 years for off-site development assignments, such as INPO. We also have on-site development assignments, such as Work Control or Site Engineering, which are intensive from a workload standpoint. Why can't the requirements of requalification be suspended for an on-site/off-shift developmental assignment?

The Operator Licensing Program Office has a number of concerns regarding such a policy change (e.g., the quality of the make-up training and testing, limits on the number and duration of the assignments, public perception, NRC involvement and resource implications). The issue has been discussed during public meetings with the Nuclear Energy Institute's operator licensing focus group members, and everyone appeared to understand the basis for limiting the requalification suspension option to off-site assignments. Operators who wish to pursue on-site developmental opportunities can terminate their licenses, pursue other activities for up to two years without having to worry about attending requalification training, and then reapply for a license. In accordance with 10 CFR 55.47, the NRC can waive the requirement for an examination if the specified conditions are met. Refer to Section D.1.g of ES-204 for more information regarding such waivers.

2. Operator Medicals are required every 24 months with no grace [period]. This causes a need to schedule shift crews more often so 24 months not exceeded. With a fixed requalification schedule, 24-month refueling outage cycle, it would be nice to have medicals the same cycle every year. So, if critical equipment (RPS, etc.) surveillance frequencies can have grace [periods], why can't operator medicals?

As noted in Appendix F of NUREG-1021, a biennial requirement can extend beyond 730 days if the requirement is met during the anniversary month of the second year. For example, a biennial medical examination last performed on January 10, 1995, would be due again by January 31, 1997. This, in essence, provides a variable grace period of up to 30 days.

3. Notification of administrative suspension of licenses due to medical reasons.

In accordance with Section C.3.a of ES-605, the facility licensee does not need to notify the NRC if the medical condition is temporary and the operator is administratively prevented from performing licensed duties or otherwise restricted, as appropriate, during the period of his or her temporary disability.

4. Can someone stand 8 hours of a normal 12 hour watch?

As discussed in Section C.2 of ES-605, the 10 CFR 55.53(e) requirement for licensed operators to maintain their proficiency may be satisfied with a combination of complete 8- and 12-hour shifts (in a position required by the plant's technical specifications) at sites having a mixed shift schedule. Watches shall not be truncated when the minimum quarterly requirement (56 hours)

is satisfied. Overtime may be credited if the overtime work is in a position required by the plant's technical specifications. Overtime as an extra "helper" after the official watch has been turned over to another watch-stander does not count toward proficiency time.

5. Are there any unwritten restrictions for "no solo" license conditions?

No. The nature of the restriction, which is determined case-by-case based on the individual's medical status and the recommendation of the facility licensee's physician, is clearly stated on the license. Section C.3.c of ES-605 (in NUREG-1021) describes some typical medical restrictions.

6. The regulations (specifically 10 CFR 55.55(b)) require license renewal applications to be filed at least 30 days before the expiration date of the existing license to ensure that the license does not expire while the Commission reviews the application? However, the regulation does not specify a "no earlier than" date for filing renewal applications. How early is too early?

In order for the NRC to have current information on which to base a renewal decision pursuant to 10 CFR 55.57(b), it is recommended that renewal applications be filed no more than 60 days before the existing license expires. If a facility licensee submits its operator license renewal applications more than 60 days in advance, the NRC regional office may contact the facility to determine whether it would prefer to have the licenses renewed immediately with a new effective date (the licenses will not be predated, nor will they exceed a six-year term) or to resubmit the applications within the 60-30 day window preceding the expiration date.

7. 10 CFR 55.53(f)(2) requires that part of the 40 hours include a plant tour. Can the plant tour be performed alone or does it have to be with an active license holder?

The NRC staff's position, based on the wording of the regulation, is that the plant tour, being part of the 40 hours to be completed under the direction of an operator or senior operator (as appropriate), must be done in the company of an active watch stander. That way the active watch stander can ensure that the reactivating watch stander is made aware of on-going activities and abnormal situations in the plant.

Operator Licensing Program Feedback

8. In accordance with 10 CFR 55.53(f)(2), an operator who fails to maintain an active license must, before resuming licensed duties, complete a minimum of 40 hours of shift functions under the direction of an operator or senior operator, as appropriate, and in the position to which the individual will be assigned; for senior operators limited to fuel handling under 10 CFR 55.53(c), one shift must have been completed. In the case of senior operators limited to fuel handling (LSROs), when and where should they stand their under-direction shift, and what level of supervision is required?

Can an inactive SRO, whose license is NOT limited to the performance of fuel handling under 10 CFR 55.53(c), reactivate as a fuel handler by completing one shift under direction?
Can LSROs maintain an active license pursuant to 10 CFR 55.53(e) between refueling outages?

The answers to these questions have been incorporated in Section C.2.b of ES-605.

Operator Licensing Program Feedback

IP-71111.11
Requalification inspections

1. 10 CFR 55.59 - the use of [systematic approach to training] SAT-based program vice regulatory based programs. Why do you have to track individual control manipulations if you have a SAT-based program?

10 CFR 55.59(c) allows licensees to substitute the appropriate SAT-based program elements (as defined in 10 CFR 55.4) for the requirements in paragraphs (c)(2), (3), and (4) (i.e., lectures, on-the-job training, and evaluation). Record-keeping is not a SAT-based program element, and the NRC needs to know that each individual actually performed the requisite control manipulations.

While a SAT-based process can replace the requirements of 10 CFR 55.59(c)(3), it is still the NRC's expectation and requirement per 10 CFR 55.59(c)(5) that individual participation in the requalification program be recorded. How each utility chooses to do this should be clearly defined in its accredited SAT-based program.

Pursuant to 10 CFR 55.57(a)(4), an authorized representative of the facility licensee must provide a statement that each operator license renewal applicant at the facility has satisfactorily completed the requalification program. Making such a statement would be difficult if the facility licensee does not individually track and document each operator's participation in the program (e.g., classroom lecture attendance, completion of on-the-job training including control manipulations, and performance on examinations).

2. "Control Manipulations" in Requal - a prior guidance from previous NRC meeting clearly indicated bean counting control manipulation from the Denton letter was a thing of the past - SAT based requal training would naturally contain a large portion of the annual/biennial tasks and evolutions, therefore, program participants would be involved during simulator training/evaluation, and/or annual Op. Eval. JPMs; "individuals simulator critical tasks" went away and "crew critical tasks" were required. Teamwork/ communications, command & control/by the team was the most important. Bottom line - the implied expectation expressed on 8/12/99 is not congruent with that provided in 1989 by Messrs. T.P., S. L., and others who provided us guidance. It appears that we are returning to the middle to early 80's again.

Reactivity Manipulations for [licensed operator continuing training?] LOCT: [The Institute of Nuclear Power Operation's] INPO's policy for tracking manipulations seems to be in conflict with NRC requirement (INPO doesn't require tracking on an individual basis).

The control manipulations conducted per 10 CFR 55.59(c)(3) or your SAT-based requalification program are individual, on-the-job training requirements, which are not to be confused with individual or crew critical tasks on the annual simulator operating test.

Pursuant to 10 CFR 55.57(a)(4), an authorized representative of the facility licensee must provide a statement that each operator license renewal applicant at the facility has satisfactorily completed the requalification program. Making such a statement would be difficult if the facility

licensee does not individually track and document each operator's participation in the program (e.g., classroom lecture attendance, completion of on-the-job training including control manipulations, and performance on examinations).

3. Is it required that each SRO be evaluated during the Emergency Operating Procedures [EOPs]? Does their documentation for the evaluation need to be done in accordance with the requirements of conducting annual exams? If so, what is the basis for this requirement?

Although each SRO does not have to be evaluated during the EOPs on every annual operating test, every SRO should be at risk of being evaluated on all of the items in 10 CFR 55.45(a) during any test. The NRC does not differentiate between different levels of SROs, so the test-item sampling should be the same regardless whether or not the operator normally stands watch in an EOP-reader position. SROs would be considered "at risk" if the facility licensee holds them responsible for the actions of the EOP readers. However, they do not necessarily have to approve each and every action required by the EOPs.

Note that ES-604 does not require crew position rotation and states that an individual would pass the dynamic simulator test if the operating crew performs satisfactorily. The NUREG-1021 requalification examination crew-based grading methodology presumes that all individual crew members, including senior crew managers, are held accountable for all of the crew's actions, and therefore are evaluated. Crew position rotation, if not required by the facility licensee's requalification program, would only be considered if it was determined to be the only way to evaluate the scope and depth of a demonstrated individual performance deficiency. The facility licensee's dynamic simulator requalification examination process is not required to be the same as that discussed in ES-604. However, if the facility licensee evaluates individual and crew performance consistent with the guidance of ES-604, then the test requirements of 10 CFR 55.59(a) would be met.

4. Are requalification inspections conducted using NUREG-1021 as the standard (i.e., 600 series) for the inspection? Are facilities subject to violations because an aspect of NUREG-1021 is not utilized during a requalification exam or is it just the inspection plan (i.e., 71111-11 vs. ES-600)?

Requalification inspections are conducted using IP-71111.11. Facility licensees are not required to use the ES-600 series of NUREG-1021 to conduct their requalification examinations. However, if a licensee's requalification program endorses or incorporates the NUREG-1021 examination process, the NRC will expect the facility to comply with its established program.

5. Can I take credit for questions other than multiple choice questions in the LOR [licensed operator requalification] exam bank, including maintenance of the bank?

Yes. However, licensees are encouraged not to abandon their multiple choice question banks in case the NRC determines that a for-cause requalification examination is necessary. Facility licensees are expected to follow their own program guidelines for bank maintenance; the guidelines in ES-601 would only apply if the licensee has endorsed NUREG-1021 as part of its LOR program.

6. How is the cognitive level determined if essay and short answer are used? (applies to operator requal exams)

As discussed in Section C.1.d of Appendix B of NUREG-1021, the NRC uses Bloom's Taxonomy to classify the cognitive level of test questions. That classification approach would apply regardless of the question format. Facility licensees are not obligated to use the same approach.

7. What are the criteria (guidance) for test item reuse throughout a biennial [requalification] cycle? ((i.e., 1) items used on more than 1 weekly quiz; 2) item used on weekly quizzes to be used on biennial exam). Need a number (upper limit) on requal test question reuse. Subjective limits lead to variability in standards and enforcement. Suggest 20-25% limit.

What is the expectation or threshold on reuse of exam materials? During the Region I Conference the NRC stated that internal policy is <50% duplication of items between exams. We all agree we want to protect the validity of the exams. However, without clear expectations from the NRC, and subjective application by an evaluator, it will be difficult to predict acceptability.

Does ES-601 E.3.b(6) allow for subjective interpretation from examination to examination based on what the specific examiner "feels" is appropriate; can we not identify this internally and have the examiner base his decision on plant specific requirements?

Biennial requalification exam -- What is the standard for reusing exam questions from weekly exams from the last 2-year biennial training program?

The NRC does not have definitive criteria (i.e., regulations) regarding the number of test items that can be reused on weekly quizzes or biennial examinations. However, as stated in Section E.3.b(6) of ES-601, the amount of item duplication will be taken into consideration during the program evaluation because it could affect the discrimination validity and integrity of the examinations. Whenever test items are repeated, they should be selected in a distributed manner and approximately equally over all previous examinations to reduce predictability (if a large number of items were taken from the most recent examination). As always, facility licensees are expected to comply with their approved training program requirements, which would be expected to vary based on the licensee's specific circumstances. For example, the same level of question repetition would have less impact if the licensee does not distribute or post its examinations until after they are all complete. The NRC will evaluate every situation on its own merits; the same upper limit may not always be appropriate, nor would it be enforceable unless it was adopted as a regulatory requirement or licensee commitment.

NRC examiners and inspectors that document test item repetition as a weakness must demonstrate that the integrity of the examination was compromised or the discrimination validity of the examination was affected by inappropriate reuse of test items. In December 2003, the NRC revised IP-71111.11, the requalification program inspection procedure, to trigger a performance-based review if and when a facility's comprehensive requalification examination

repeats more than 50 percent of its test items from previously administered comprehensive requalification examinations between and among crews undergoing the same requalification training program. The inspectors would apply the guidance in Appendix D of the IP to examine the crews' average scores to determine whether they show any pattern of rise over successive crew examination administrations or any unexplained higher-than-expected crew mean scores. Although the IP focuses specifically on the written examinations, the same 50 percent repetition philosophy would apply equally to the operating test.

8. If a JPM exam is failed, can one of the failed JPM's be used in the retake examination?

It would certainly be appropriate to test the operator to determine if the remedial training was successful, and to include the failed material in that sample. However, the annual operating test given pursuant to 10 CFR 55.59 should consist of a new sample of test material to confirm the operator's overall competence.

In accordance with Appendix D of IP-71111.11, the requalification program inspection procedure, NRC inspectors will ensure that any test items that appeared on the original failed examination are not included as a part of the retake examination. Reusing the same items (missed or correct) from the original failed test on the retake examination is a flawed practice that would falsely bias the test results upward, inflating and distorting true retake performance. Moreover, including any of the same items on the retake test amounts to little more than a review – not a test as it is operationally defined.

9. During a recent inspection, the validation of a scenario did not match crew response. The utility's examiner response was to remove the scenario from the exam. What and where are the standards for this?

If the NRC were administering the test, it would not replace the scenario because a crew did not perform as expected unless the scenario was found to contain a serious flaw. Rather, the examiners would document actions taken by each of the crews and later determine if they responded correctly under the given conditions. The examiners would also expect the facility licensee to determine whether the deviation could have resulted from a simulator fidelity problem.

In accordance with 10 CFR 55.4, a training program based on a systematic approach must be evaluated and revised based on the performance of the trained personnel in the job setting. The fact that a crew deviates from a validated scenario suggests a problem in the training program that may not be fully understood if the scenario is replaced.

10. If an instructor sees a scenario, trains [the] next crew, [then] administers same scenario [to that crew] (doesn't know in advance), is this a problem?

Yes. This clearly raises a question regarding the validity of the second crew's operating test. The facility licensee should probably administer an additional scenario to remove any question regarding the operators' competence.

The facility licensee should also evaluate its testing program to determine if corrective measures are necessary to preclude similar situations from recurring. If the facility licensee's program includes exam security restrictions similar to those endorsed by the NRC in Section D.6 of ES-601 (in NUREG-1021), then the instructor should not have been involved in training activities after gaining knowledge of the exam contents.

11. Can the annual operating exam (simulator & JPMs) be split between two consecutive cycles (i.e., successive retraining weeks which is approximately every 5 weeks for a crew)? The licensed operators received annual JPMs in Nov./Dec. 1999 then received the annual simulator exams in Jan./Feb. 2000. The two together comprise the annual operating exam.

The answer to Question No. 354 in NUREG-1262, "Answers to Questions at Public Meetings Regarding Implementation of Title 10, Code of Federal Regulations, Part 55 on Operators' Licenses," states that the annual operating test needs to be done at one time and provides an unacceptable example in which the parts of the test are separated by six months. However, your proposal to administer the dynamic simulator and walk-through portions of the operating test during consecutive requalification training weeks (nominally 5 weeks apart) is acceptable (and we understand from our Regional Offices is already being done at some facilities) subject to the following conditions:

- The regulation (10 CFR 55.59(a)(2)) requires each operator to pass an annual operating test. Splitting the test such that the walk-through is given in one calendar year and the simulator test in the next (as in your example) may create a problem with regard to regulatory compliance.
- The operating test (scenarios and JPMs) must be comprehensive and conducted in accordance with the facility licensee's approved, SAT (systematic approach to training) based training program.
- Any significant remedial training that is determined to be necessary should be completed in a timely manner and not deferred until the entire operating test has been administered. If an operator fails either portion of the operating test, this would include removal from licensed duties pending satisfactory completion of the required remedial training and retesting.

12. The term "biennial" is defined in NUREG-1021, Appendix F as being: "In most instances, a period of time equal to 730 days and synonymous with the term "two years." Biennial requirements can extend beyond 730 days if the requirement is met during the anniversary month of the second year. For example, a biennial medical examination last performed on January 10, 1995, would be due again by January 31, 1997. January is seen as the anniversary month, the period of time between the two examinations is longer than 730 days, but the biennial requirement is satisfied."

This term (biennial) has often been used in discussing the requirement for a comprehensive written examination required as part of the 24 month continuous requalification program noted in 10 CFR 55.59(a).

QUESTION: Is the comprehensive written examination required at the end of the 24 month program to be completed for each licensee within 30 days of the anniversary date of their last written examination?

This issue has been addressed in Section C.1.a of ES-605 (in NUREG-1021).

13. What are the requirements for sampling all items in 10 CFR 55.41 and 55.43 on the requalification exam?

As noted in response to a similar question related to the operating test (refer to ES-603, FAQ#1), the sample should be thorough or broad, but not every item listed in the regulation has to be covered on every examination. Moreover, the response to FAQ#3 under IP-71111.11 indicates that operators should be at risk of being evaluated on all of the applicable items during any examination. Since the requalification examinations are part of a systems approach to training (SAT), they should emphasize the topics covered during the training cycle; however, the NRC expects that they would also cover topics from outside the requalification cycle in order to determine areas in which retraining is needed (refer to 10 CFR 55.59(c)(4)(i)).

14. What happens if an individual is unable to successfully complete the requal exam prior to the end of the 2-year program cycle? He is already administratively restricted from standing watch.

As noted in response to Question #328 in NUREG-1262, "Answers to Questions at Public Meetings Regarding Implementation of Title 10, Code of Federal Regulations, Part 55 on Operators' Licenses," it is only under extenuating circumstances (e.g., a special temporary assignment to a remote location, an extended illness, or enrollment in a degree program) that the NRC condones removing licensed operators from the requalification program. In such cases, the NRC generally invokes the provisions of 10 CFR 55.59(b), "Additional Training," to ensure that the affected operator is qualified prior to returning to licensed duties. Planned absences are processed as described in Section C.1.c of ES-605 of NUREG-1021. Unplanned incompletions and restorations should be documented and handled on a case-by-case basis in consultation with the NRC regional office.

15. It is not uncommon to have on-shift crews staffed to beyond the minimum complement required by technical specifications. For this type of situation, is it acceptable to have a licensed operator participate in one scenario and still fulfill the requirement of completing an annual operating test (provided the facilities training program allowed this)? NUREG-1021, ES-604, is quite clear on crew dynamic simulator tests needing to be two scenarios but does not specify whether or not every crew member needs to be in an evaluated position for both scenarios.

As noted in the response to Question #4 above, facility licensees are not obligated to follow NUREG-1021 unless it is incorporated as part of their approved requalification program.

Operator Licensing Program Feedback

Although there is nothing in the regulations that dictates how many scenarios are required and whether every operator has to be in an evaluated position during each scenario, the guidelines in the NUREG are based on good practices and expectations that are widely practiced in the industry. For example, it is a good practice to train and test the crews in the same configuration as they operate in the control room; to do otherwise would run the risk of providing negative training. The fact that you have more than the minimum required number of operators on shift, does not mean that you should leave some of them “on the bench” during a simulator scenario or a real event in the control room. The NRC would expect you to construct your operating tests with a sufficient number of events and scenarios to ensure that every operator on the crew gets a meaningful evaluation.

Operator Licensing Program Feedback

Simulators;
Fidelity and testing of plant-referenced simulators

1. Why is scenario-based-testing the simulator's performance a challenge?

The challenge related to scenario based testing (SBT) appears to have a couple of aspects: 1) SBT is a relatively new concept and related guidance on the use of SBT may be unclear or ambiguous; and 2) how the industry started to implement the guidance, albeit with good intentions, may be different than what the staff believes is reasonably necessary to satisfy the provisions of ANSI/ANS-3.5-1998. Insufficient test scope and fidelity criteria as well as inadequate test results and evaluation of the test results are the overriding challenges to be met. Fortunately the industry and NRC are communicating in the area and additional guidance may be warranted.

First, NRC staff endorses the ANSI/ANS 3.5-1998 testing principles of section 4.4, Simulator Testing. The need to establish criteria, take data, evaluate data against acceptance criteria and take action on deviations (assumed to be more than minor) are fundamental and paramount testing principles as reflected holistically in section 4, in particular, and in the rest of the standard. The details as to how to implement SBT related to various types of tests (steady state, normal evolution, malfunction and transient tests) appears to be unclear to and/or misunderstood by a number of stakeholders.

The NRC staff understanding of section 4.4.3.1 third full paragraph is that the SBT could be used to take credit for malfunction and normal evolution testing provided: (1) the evolutions are performed in accordance with reference unit procedures; and (2) test results are evaluated and documented. We refer to these conditions later as "additional conditions" when SBT is elected and these additional conditions apply only when SBT is credited for certain types of operability testing. As noted in Regulatory Guide 1.149, Revision 3, section B: In the staff's view, verification and validation testing in the software development process, coupled with scenario-based testing in the training and examination preparation processes, provides additional assurance of acceptable simulator performance over that provided by previous simulator capabilities-based, stand-alone testing programs. Unfortunately, Revision 3 of the regulatory guide never continued the clarification from Revision 2 section C.1.5 third paragraph of the Reg. Guide 1.149:

"Performance and malfunction testing may be integrated with a facility licensee's approved or accredited training program that uses a systems approach to training if performance data are obtained ... and analyzed for compliance with the performance criteria listed in ANSI/ANS 3.5-1993 [emphasis added]."

This may be a source of confusion.

With respect to the 1998 version of the standard for simulator performance testing, the NRC has accepted the capability criteria noted in Section 4.1 (which address, among other things, real time and repeatability, steady state operation, normal evolutions, and malfunctions (including transients)). Section 4.4.3.1 references Appendix B as providing examples of acceptable simulator operability tests. Appendix B, in turn, refers to Section 4.1.4 as the acceptance

criteria for transient performance testing. Thus, the NRC expects that the guidance in Section 4.1.4 will be used to develop the acceptance criteria for transient tests. We understand and expect that the guidance in Section 4.1 is being used to develop the acceptance criteria for performance tests if a facility commits itself to the 1998 version of the standard. Transient testing is defined in Appendix B of the standard, as applicable to the facility.

If SBT is elected for crediting malfunction and normal evolution testing as permitted by the standard, then the additional conditions referred to earlier also apply in addition to establishing the simulator capability criteria of Section 4.1 for malfunction and normal evolution testing. We strongly suspect that the acceptance criteria used at some simulation facilities to satisfy the operability testing of Section 4.4.3.1 may not include one or more of the following acceptance criteria common to both the malfunction and normal evolution capability criterion: 1) observable change in the parameters correspond in direction to those expected for actual or best estimate of the normal unit operation or the response of the reference unit to the malfunction; 2) simulator shall not fail to cause an alarm or automatic action if the reference unit would have caused an alarm or automatic action under identical circumstances; 3) simulator shall not cause an alarm or automatic action if the reference unit would not cause an alarm or automatic action under identical circumstances. The NRC staff believes that these criteria will require some thought when malfunctions are combined in an SBT. Furthermore, the staff believes that the ANSI/ANS-3.5-1998 criteria are not unreasonable and that simulation facility testing personnel along with subject matters expert should be able to come up with reasonable criteria (based upon actual or best estimate reference plant data). More than minor deviations should then be evaluated.

NRC acknowledges that the best estimate for SBT of the depths of EOP activity will be a considerable challenge and this area may warrant additional discussion between NRC staff and the industry. Detailed parameter chart comparisons for the depths of the EOP are difficult and may not be warranted. The NRC expectation is that it should at least be possible for SMEs (when actual plant or predicted data is not available), at the conclusion of an SBT to review tests results and confirm that observable changes in key parameters corresponded in direction to the expected response, the simulator did not fail to cause an expected alarm or automatic action, and that the simulator did not cause an unexpected alarm or automatic action.

It should also be noted that the SBT methodology is permitted for only certain operability tests and they don't include steady state and transient tests.

SBT used to satisfy Section 4.4.3.2 must demonstrate capability to satisfy predetermined learning and examination objectives without exceptions, significant performance discrepancies, or deviation from the approved scenario sequence. The NRC expects that the acceptance criteria of Section 4.1.4 should be applied to the SBT used to meet Section 4.4.3.2. This is to ensure that "no negative training" results not only because of failure to meet training and procedure objectives but also because of failure to meet the simulator capability criteria. Again, the NRC recognizes that detailed parameter chart comparisons for the depths of EOPs may not be practical and therefore is not warranted. However, the NRC expects that it should at least be possible for SMEs (when actual event or predicted data is not available), at the conclusion of a SBT, to review the test results and confirm that observable changes in key parameters correspond in direction to the expected response, the simulator did not fail to cause an expected

alarm or automatic action, and that the simulator did not cause an unexpected alarm or automatic action.

2. What impact do computer upgrades and re-hosting have on performance tests?

Upgrades to licensee simulation facility plant-referenced simulator computer systems and re-hosting onto new computer platforms should not alter model performance characteristics. It is expected that similar results will be achieved when comparing performance test runs after an upgrade or re-host to the same test runs before the upgrade or re-host. Verification and validation testing shall be conducted, as required by Section 4.4.1 and 4.4.2 of the standard (1998), following a system upgrade or re-host to confirm that model characteristics have not changed. Although not a requirement of the ANSI/ANS-3.5 standard or the 10 CFR 55 regulations, it is prudent to run the simulator operability tests (i.e., steady-state, and transient tests) following a computer upgrade or re-host to ensure or demonstrate no unintended consequences to models.

3. Are simulator design specifications required to be updated?

Plant-referenced simulators model systems of a reference plant. "Reference plant" is defined in 10 CFR 55.4 as "the specific nuclear power plant from which a simulation facility's control room configuration, system control arrangement, and design data are derived."

ANSI/ANS-3.5-1998, Section 5.1.2 Simulator Design Data Base Update, requires that the simulator design data base (i.e., design specifications) shall be periodically updated (i.e., within 18 months of the reference unit's commercial operation date or the simulator's operational date, whichever is later; or following the initial update, new data shall be reviewed, and revised, once per calendar year.) Maintaining the fidelity of the plant-referenced simulator includes updating the design specifications. The particular methodology for updating design specifications is determined, for the most part, by the facility licensee's simulator configuration management control (i.e., ANSI/ANS-3.5 standard requires, among other criteria, that a means for establishing and maintaining a simulator design baseline shall be included in the configuration management.)

4. Is the NRC rethinking how simulator performance and testing is being conducted?

No, the NRC is not rethinking the types of tests or how simulator testing is to be done. The staff is interested in clarifying expectations for acceptable scenario based testing for certain types of tests in light of industry feedback and results of inspections to date. See Question #1 above.

With respect to scenario based testing (SBT) as noted in ANSI/ANS-3.5-1998, Section 4.4.3.2, SBT provides a methodology, along with Section 4.4.3.1, "Simulator Operability Testing," by which the plant-referenced simulator is to be performance tested. The 1998 standard requires that, "scenarios developed for the simulator, ..., shall be tested before use for operator training or examination." The standard also requires that "a record of the conduct of these tests, ..., and the evaluation of the test results, shall be maintained." Historically, as well as currently, simulator scenarios used in the operator licensing programs (both initial and requalification) are developed, for the most part, in accordance with guidance in NUREG-1021, "Operator Licensing

Examination Standards for Power Reactors," for the primary purpose of evaluating the performance of operators in an operating test setting. The NUREG-1021 scenario development scheme does not provide guidance, and is not intended, to evaluate a plant-referenced simulator's performance. The NUREG's overriding supposition is that the plant-referenced simulator is to be operated in the same manner as the reference plant using the plant operating procedures.

Additionally, as a result of experience gained from conducting plant-referenced simulator inspections since implementation of the simulator rule (November 16, 2001), the staff has raised concerns regarding how simulator performance testing is being conducted to ensure compliance with the definition of performance testing as described in 10 CFR 55.4. To-date, the concerns are generally case specific but could reach a threshold whereby it is a generic concern. As long as simulation facility licensees honor their commitment to a specific ANSI/ANS-3.5 standard, which provides adequate requirements on how the plant-referenced simulator is to be performance tested and the conduct of the tests, the staff believes that compliance with the rule requirements can easily be met. The NRC's participation on the standard's working group helps to ensure that a balanced approached is taken when formulating a new standard.

5. What type of plant reference data is used when designing a plant-referenced simulator? (i.e., Is it acceptable to use plant procedures, as-built instrument and electrical prints, Licensee Event Reports, Technical Specifications, and Final Safety Analysis Report?)

The intent of reference plant data used for simulator design is to provide the basis information for design of a simulator that accurately models the actual reference plant response. Controlled plant documents can provide valuable information as to expected response. Examples of design data are provided in Appendix A of ANSI/ANS 3.5 and include most of the sources listed in the question above. Other possible sources include piping diagrams, instrument and control diagrams, startup tests, component operational data, and observed operations.

6. What is actually required when documenting SBT (Scenario-Based Test)?

Documentation of a plant-referenced simulator's performance tests, including SBT, provides evidence that testing has been properly conducted and that test results have been properly evaluated. The documentation of the performance tests should verify a simulation facility's performance as compared to actual or predicted reference plant performance and to learning and examination objectives. The rule (10 CFR 55.46(d)(1)) requires that the results of performance tests must be retained for four years after completion of each performance test or until superseded by updated test results.

For SBTs used to satisfy the operability testing of Section 4.4.3.1, the NRC expects that acceptance test criteria and test results showing the acceptance criteria were satisfied should be documented.

For SBTs used to satisfy the testing of Section 4.4.3.2, the NRC expects that the following should be documented: (1) the initial conditions, description of the scenario and perturbations used to induce the transient; (2) learning and examination objectives and the performance

criteria of Section 4.1.4; (3) positive demonstration or, alternatively, an assertion that the learning / examination objectives were met; (4) listing of key parameters checked and assertion that there were no unexpected changes; (5) listing of key alarms / automatic actions occurring and assertion that they would be expected for the scenario; and (6) assertion that no unexpected alarms / automatic actions occurred.

7. What is the periodicity for SBT? (i.e., how recent that data is verified?)

SBT periodicity is not specifically addressed by the regulations but can be reasonably inferred as "when needed" periodicity. The regulations do require that facility licensees conduct performance testing throughout the life of the simulation facility in a manner sufficient to ensure that simulator fidelity requirements are met. The ANSI/ANS-3.5-1998 standard in Section 4.4.3.2 requires that the scenarios be tested before use for operator training or examination. The standard does not elaborate further as to retesting scenarios. It is expected that configuration control procedures will identify facility expectations for testing scenarios based on changes to previously tested scenarios, changes to plant procedures that may affect SBT results, modifications to the plant and simulator that may affect SBT results, and simulator modeling changes that may affect scenario test results.

It should be noted that the scope of 10 CFR 55.46(c)(1)(i) includes those activities of 10 CFR 55.45 which include initial exams and requalification exams and the specific steady state and transient tests of 10 CFR 55.59(c)(3)(i)(A) through (AA). Because of this scope, SBT applies before the use of scenarios for initial and requalification exams required by Part 55.

8. The Operator Requal Human Performance SDP (Significant Determination Process) makes no mention of implementation of modifications. ANS-3.5 allows time for reference plant modifications to be simulated based on training-needs-analysis. What is the staff's position with regard to installing modifications on the simulator before being installed on the referenced plant?

The focus of the SDP is to ensure a finding is analyzed based on the effect on operator actions or the actual or potential for negative training. The ANSI/ANS-3.5 allows for simulator modifications to be completed either before or after the modifications in the reference plant. Decisions as to timing of the simulator modifications should be based on an analysis of training needs and must also take into consideration proposed uses of the simulator and the effect on operator actions. Plant-referenced simulators are used in initial and requal examinations and, in some cases, for eligibility requirements of 10 CFR 55.31. When used to meet these requirements, plant-referenced simulators must accurately reflect current design of the referenced plant and not produce negative training.

Under almost all circumstances, the staff expects that a plant-referenced simulator used for 10 CFR 55 purposes will reflect current as-built design of the reference plant. Use of other-than-plant-referenced simulator (or a plant-referenced simulator that differs from the plant only because of a recent modification) requires Commission approval. In cases where a plant-referenced simulator differs from its reference plant as a result of plant modifications, the NRC expects differences training to compensate for deviations from the reference plant to preclude or compensate for any negative training. For example, if a reference plant modification

is planned for completion in the last few weeks leading up to an initial license examination, it might be desirable to delay installation of the modification on the simulator until after the examination to avoid disrupting the orderly planning and administration of the exam. However, this choice could call any licensing decision made using that simulator into question because the potential exists that skills demonstrated on the simulator would be different from what would be required in the plant for which a license is to be issued. In this case, a facility licensee could request in writing Commission approval to use the simulator while it differs from the reference plant. The request should address steps to be taken to prevent or compensate for negative training. The NRC has the option of granting such a request.

9. How is simulator performance validated?

Validation of simulator performance is addressed by ANSI/ANS-3.5-1998, Section 4.4.2. It states that "Validation testing is a form of software development testing performed by comparison of simulated component or system results against actual or predicted reference unit performance data in either a stand-alone or integrated fashion." Validation testing is conducted prior to the simulator's use in training and examination for the following situations: (1) completion of simulator initial construction; (2) whenever models are changed or modified; and (3) whenever there are changes which have the potential to affect simulator capabilities or repeatability. The method for accomplishing and documenting validation testing is dependent on the software/hardware changes to be validated and the licensee's configuration control requirements. ANSI/ANS-3.5-1998 allows validation to be conducted in either a fully integrated, partially integrated, or stand-alone mode of system operation. As a minimum, each facility must generate and maintain validation test documentation.

Region-based inspectors conduct periodic (biennial) baseline inspections of the licensed operator requalification programs (under IP-71111.11 guidance) and these inspections now include a review of simulator fidelity. Among other things, inspectors will review validation testing documentation to determine the effectiveness of the licensee's process for identifying and resolving simulator problems especially when the results of performance testing raise questions or there is insufficient documentation to show that adequate performance testing was conducted.

10. Will the staff determine whether or not a particular model is correct?

The facility licensee has responsibility for maintenance and testing of their plant-specific simulators. Accordingly, the licensee is expected to ensure their simulator adequately demonstrates expected plant response through appropriate testing. NRC staff evaluates simulator performance during the biennial baseline requalification inspection. Inspectors review simulator test documentation and the facility's deficiency reporting to ensure fidelity of the simulator is being maintained.

11. We have replaced some models with new models; What if the new model shows a different response than the old model? (With regard to malfunctions such as LOCAs and transients with no plant data).

Steady state and transient testing is performed to verify fidelity of simulator response as compared to actual or best-estimate (where actual performance data is not available) reference plant response. With regard to the situation where a new computer model yields results that differ from previously validated results, two possible causes are indicated. One is that the new model is not as accurate as the old. The second possibility is that the new model is more accurate than the previous model. If the licensee has confidence that the original model matches best estimate data, then it is apparent that the new model needs additional development effort before it is ready for training.

The more difficult situation is the one where the new model calls the old model's validity into question. This situation could occur if there were problems with data originally used to represent best estimate data for the reference plant response. A re-evaluation must be performed to determine best estimate data when doubt exists as to which model (or whether either model) accurately reproduces expected reference plant response. In the absence of actual plant data, a detailed engineering analysis would provide a best-estimate of expected plant response.

If the best-estimate revealed significant problems with the existing model and this model had been used to negatively train operators, then reactor safety may have been impacted. The facility corrective action program would need to determine the extent to which the operators had been negatively trained. Retraining, if indicated, would follow. NRC requalification baseline inspections monitor performance in this area.

12. We are on the '98 standard, how often do I need to validate the simulator's response?

ANSI/ANS-3.5-1998, Section 4.4.2, requires that validation tests shall be conducted prior to the simulator's use in training and examination for the following situations: (1) Completion of simulator initial construction; (2) Whenever models are changed or modified in a way that potentially affects fidelity relative to the reference unit; and, (3) whenever there are changes which have the potential to affect simulator capabilities or repeatability, including changes to computer platforms, operating systems and run-time utilities, interface systems, or instructor stations.

13. What constitutes an adequate degree of replication and if not adequate what is the safety significance?

The degree of replication depends on the type of evolution (steady state, transient/malfunction, normal evolution) and the applicable operability test acceptance criteria assuming adequate acceptance criteria have been established. For example the ANSI/ANS requires that certain steady state parameters meet at 2 percent tolerance. If there as been an identification of a fidelity issue in which the applicable parameter is beyond 2 percent, then the degree of replication is unacceptable since it would fail the steady state acceptance criterion.

For alarms and automatic action (or interlocks), the plant's calibration and surveillance testing acceptance criterion (instrument tolerances) should be an adequate method for determining the degree of replication.

An ancillary question to the above is: "What are the first order principles for NRC staff analysis in order to determine if a simulator fidelity performance deficiency is minor or not with respect to 10 CFR 55.46(c)(1) and what safety significance level could result? The issue is related to the human performance attribute in the three reactor safety cornerstones of initiating events, mitigation, and barrier controls per MC 0612, App. B. Performance deficiencies are more than minor and are of very low safety significance if they involve actual or potential impact on operator actions per MC 0609, Appendix I, Blocks 6 and 12, along with the basis statements for the questions in the blocks (Note: This a broader definition of negative training from that defined in ANSI/ANS 3.5-1998 definitions section). These issues are not of greater significance because they did not have an adverse impact on operator actions such that safety related equipment was made or would have been made inoperable during normal operations or in response to a plant transient. If there was an effect to this degree, the performance deficiency would be analyzed per MC 0609, Appendix A (PRA basis). Minor performance deficiencies that have no effect or impact on operator actions are generally not documented in the inspection report.

See also Question #26.

14. How should the MANTG SBT evaluation form be revised to satisfy the NRC staff? What level of detail is needed in the scenario guide used to support SBT?

See Question #6.

15. For malfunction and normal evolutions that do not constitute steady state and transient tests, do the associated SBTs have to have the appropriate to the circumstance simulator capability criteria (section 4.1) for the following situations: 1) used as an operability test; 2) used to test a malfunction or normal evolution specifically listed in the rule 10 CFR 55.46(c)(1)(i) scope which references the specific steady state and transient tests of 10 CFR 55.59(c)(3)(i)(A) through (AA); and , 3) used to test a malfunction or normal evolution not specifically listed in the requal rule of part 55 but the malfunction or normal evolution is used to support a scenario for an exam required by Part 55 based on 10 CFR 55.45 operating test criteria.

Yes to all of the above situations.

16. What communication to the NRC is needed related to modification of the simulator done before the plant but the simulator is in use for initial exams or requal exams?

See Question #8.

17. How long does the following test documentation have to be kept and where are those requirements: V&V tests, Operability Tests, SBTs?

See Question #19.

18. What are the simulator capability criteria (SCC) for transient tests listed in the App. B of the standard? Is it more than the equipment malfunction or normal evolution SCC but not as much at the Steady State- i.e., parameter traces compared to best estimate data?

Also see Question #1. Based on a careful review of the list in Appendix B of the various versions of the ANSI/ANS 3.5, the transient test are essentially malfunction tests subject to the SCC for malfunction testing. In addition to the procedural objectives of a malfunction test, other important criteria apply: 1) observable change in the parameters correspond in direction to those expected for actual or best estimate of the normal unit operation or the response of the reference unit to the malfunction; 2) simulator shall not fail to cause an alarm or automatic action if the reference unit would have caused an alarm or automatic action under identical circumstances; and, 3) simulator shall not cause an alarm or automatic action if the reference unit would not cause an alarm or automatic action under identical circumstances.

19. Record retention: "... retained for four years after the completion of each performance test or until superseded by updated test results." How long can the "or" in this statement be – the life of the plant, for example?

Four Year Record Retention: do records older than four years have to be retained, such as acceptance tests from original certification, etc?

Per 10 CFR 55.46(d)(1), the performance test results (as defined in 10 CFR 55.4) are expected to be retained for four years after the completion of each performance test. Generally, simulator performance tests are conducted on a periodic basis in accordance with ANSI/ANS 3.5 and the facility licensee's simulator testing schedule. The test results are subject to review by the NRC and a retention period of four years is prescribed so that an evaluation and comparison can be made for a given performance test over a period of time (up to four years) to ensure that simulator fidelity is being maintained. However, if a performance test is not repeated until a period of more than four years has passed, then the record of the performance test should be retained until superseded by the subsequent test. When a performance test is superseded before four years, then the four year period resets for the updated test. The rule still requires that the facility licensee conduct performance testing throughout the life of the simulation facility.

Keep in mind that the standard requires that: (A) in Section 4.4.1, that verification tests (i.e., software design documentation) be generated and is updated. (B) in Section 4.4.2, that validation test documentation be generated and that a record of the conduct of this test, the test's results, and the test's evaluation be maintained. It further requires that these tests be

conducted prior to the simulator's use in training and examination for the following situations: (1) completion of simulator initial construction; (2) whenever models are changed or modified in a way that potentially affects fidelity relative to the reference unit; and, (3) whenever there are changes which have the potential to affect simulator capabilities or repeatability. (C) in Section 4.4.3.1, that operability tests be conducted on a periodic basis and that a record of the conduct of this test and its evaluation be maintained. (D) in Section 4.4.3.2, that SBTs be tested before use for operator training or examination and that a record of the conduct of these tests, and the evaluation of the tests results be maintained. Implementing these standard requirements are measures acceptable to the staff for implementing the demonstration requirements of 10 CFR 55.46(c)(1).

Updating and maintaining tests documentation is ongoing. No relief is provided in the standard that allows cessation of maintaining the test records. Simulator test records provide evidence of simulator fidelity. If for no other reason, it would be prudent for licensees to retain all such records as a means of providing assurance of fidelity should it be brought into question by a future plant or industry event.

20. Scenario validation: is there a shift in mind set on scenario validation? In other words, the '98 standard reads as if no student should be exposed to an un-validated scenario. Are you saying this is not the case?

Transition from 1985 to 1998 Standard: if initial license candidate training scenarios worked fine under the 1985 standard, would they have to be tested again prior to adopting the 1998 standard?

The ANSI/ANS-3.5-1998 standard, in Section 4.4.3.2, states that, "Scenarios developed for the simulator, including the appropriate instructor interfaces and cuing, shall be tested before use for operator training or examination." The staff understands this section of the standard to mean that a performance test which evaluates the performance of the simulator as compared to the actual or predicted reference plant response must have been satisfactorily conducted for each scenario used for operator training or examination. Minor deviations from these scenarios, such as those used in training to demonstrate sensitivity of plant response to changes in initial conditions, need not be performance tested. A scenario-based test, once properly conducted with satisfactory results, need not be repeated provided nothing has changed (in the plant, simulator, or operating procedure) that could alter the results of the performance test.

The issue of previously used scenarios prior to adopting the ANSI/ANS-3.5-1998 standard is not addressed by the standard. "Grand fathering" previously used scenarios should be carefully reviewed before declaring that the scenario is a "simulator scenario-based test." Such a practice would likely be questioned because previously used scenarios were developed solely to train and evaluate individual operators or operating crews and were not designed to evaluate the performance of the simulator per se against the reference plant. In general, it was assumed that the simulator was operated like the actual plant, irrespective of whether or not it had been performance tested to validate the assumption. As a consequence, individual operator or crew performance was evaluated while simulator performance was not, by design, evaluated and documented. Hence previous testing may not be sufficient.

21. Core performance: what standards are being used to ensure the simulator performance replicates reference plant nuclear and thermal hydraulic operating characteristics, since there is a broad range of core models out there?

ANSI/ANS-3.5-1998 (1993)(1985) establishes the functional requirements for the plant-referenced simulator. It also establishes the criteria for the degree of simulation, performance, and functional capability. With regard to ensuring that the nuclear and thermal hydraulic characteristics are replicated appropriately, the standard, in Section 3.1, "Simulator Capabilities," requires that the response of the simulator resulting from operator action, no operation action, improper operation action, automatic reference unit controls, and inherent operating characteristics shall be realistic and shall not violate the physical laws of nature. Nuclear and thermal hydraulic characteristics are fundamental and must be consistent with the laws of nature. The standard (1998), in Section 4.1.3.2, requires that performance of procedures on the simulator, including core performance type procedures, shall be compared to and demonstrated to represent correctly the response of the reference unit at the same power level consistent with the reference unit procedures and data availability. The standard establishes six acceptance criteria with regard to simulator response during the conduct of the performance tests: (1) be the same as the reference unit startup test procedure acceptance criteria; (2) be the same as the reference unit surveillance procedure acceptance criteria; (3) be the same as the reference unit normal operating procedure acceptance criteria; (4) require that the observable change in the parameters correspond in direction to those expected for a best estimate of normal unit operation; (5) require that the simulator shall not fail to cause an alarm or automatic action if the reference unit would have cause an alarm or automatic action under identical circumstances; and (6) require that the simulator shall not cause an alarm or automatic action if the reference unit would not cause an alarm or automatic action under identical circumstances. These standards are quite high when applying them to the nuclear and thermal hydraulic characteristics.

See also Question #27.

22. Malfunction tests: when on the '98 standard and asked for a malfunction test (which is no longer required), what are we supposed to give the inspector? For example, the individual was asked to produce a malfunction test showing a single reactor feed pump trip and he did not have such a test nor could he find the requirement to do one.

ANSI/ANS-3.5-1998, in Section 3.1.4, discusses that the determination of the type and number of malfunctions to be simulated shall be part of a Systematic Approach to Training process for the design of performance-based operator training programs. The specific malfunction testing required of the simulator must at least encompass the requirements specified in the reference unit's accredited licensed operator training programs. Loss of normal feedwater, or normal feedwater system failure is one the required malfunction(s) that shall be included in the simulator design. For any malfunction that is within the design of the simulator but not included within the training program, the NRC would expect that the malfunction would either be tested directly as part of the annual simulator operability tests requirements of the standard or that the annual operability testing program would be sufficiently robust that it would provide confidence that the basic models utilized in the simulation of the malfunction remain sound. If the licensee does not have a scenario-based-test or annual operability test for this malfunction, the licensee

should be able to provide an annual operability test that confirmed the soundness of the basic model related to this malfunction.

23. IP-71111.11 Appendix C: are resident inspectors trained on the contents of this new appendix, and more importantly if regional examiners are going to extract data from the resident's reports, are the residents trained on the proper use of terminology with regard to simulator performance?

The NRC's expectation for resident inspectors in this area is primarily to identify significant simulator fidelity issues. Such identification is within the current capability and training of the inspectors.

24. Scenario based testing results: there does not seem to be a requirement to have firm documentation for documenting scenario based testing results. Is this correct?

ANSI/ANS-3.5-1998, in Section 4.4.3.2, states that a record of the conduct of these tests, typically in the form of a completed scenario or lesson plan checklist, and the evaluation of test results, shall be maintained. The level and degree of documentation of the record of the scenario-based test conducted is not prescribed in the standard. Absent the inclusion in the record of acceptance criteria used for the scenario based tests and documentation of results in some form that would allow the NRC to confirm that acceptance criteria were met, the NRC will be unable to confirm that a proper evaluation was conducted. This could adversely impact NRC's crediting of the simulator for training and experience and use of the simulator for examinations.

See also Question #6, for more details on documentation.

25. 10 CFR 55.31 versus 55.46: If a candidate got some of his reactivity manipulations on a core in the plant that was then refueled and he then got additional manipulations, the earlier manipulations would still count and yet this is not the case with the simulator core load. Why?

Reactivity manipulations which are performed on the plant-reference simulator for an applicant to meet the experience eligibility requirements are credited when the simulator at the time of performance meets the requirements of 55.46(c)(2)(i) and (ii). The rule requires that the plant-referenced simulator utilizes models relating to nuclear and thermal-hydraulic characteristics that replicate the most recent core load in the nuclear plant for which a license is sought; ... The Commission, in its response to public comments during the rule making process, interpreted "most recent" as the current core, or if in a refueling outage, the previous core. The intent is to ensure that the applicant has a like-kind experience as he would have in the reference plant. As is the case with reactivity manipulations conducted on the plant, any appropriate reactivity manipulation performed on the simulator may be credited provided the simulator replicates the most recent core at the time of the manipulation.

26. Please define the term "replicate" as found in 10 CFR 55.31 and 46.

SECY-01-0125, dated July 10, 2001, Analysis of Public Comments, Comment 3-3 Response addressed this question. The Commission believes that the terminology (in the proposed rule and subsequently in the final rule) is appropriate and consistent with ANSI/ANS-3.5-1998. It means that the plant-referenced simulator's nuclear and thermal-hydraulic models operate within the tolerances specified in section 4.1.3, "Steady-State and Normal Evolutions," of the industry standard.

See also Question #13.

27. Core performance testing (ANSI/ANS-3.5-1998, Section 3.1.3, item 9): what is core performance testing? I understand it to be the same thing an operator would do in the course of his job, and this differs greatly between PWRs and BWRs.

The regulations, in 10 CFR 55.4, define performance testing as testing conducted to verify a simulation facility's performance as compared to actual or predicted reference plant performance. Core refers to the nuclear reactor core, including but not limited to the design, configuration, and nuclear and thermal hydraulic characteristics of the core as well as the associated nuclear instrumentation that monitors or measures the various parameters which provide insight to the behavior and operating characteristics of the core. In summary, core performance testing means testing conducted to verify a simulation facility's core performance replicates actual or predicted reference plant core performance. Core performance testing is not the same thing an operator may or may not do in the performance of his job. Absent conduct of the same core performance tests on the simulator as are performed on the plant and demonstration through such testing that the simulator meets actual or predicted plant performance within the acceptance criteria of the ANSI/ANS 3.5 standard, the NRC may not be able to confirm core replication in the simulator. This could adversely impact crediting of experienced gained on the simulator.

See also Question #21.

28. 1985 standard vs. new 55.46 rule: if I'm on the 1985 standard, how do I meet 55.46 requirements to use the simulator for reactivity manipulations when the 1985 standard does not have detail for core model testing?

Refer to answers to Question #21 and #27.

29. Core vs. Thermal-hydraulics replication: we've talked a lot about core performance testing: how does the NRC propose how to test thermal-hydraulic performance?

Generally, the NRC does not prescribe how to conduct a performance test, but instead challenges a licensee to demonstrate that certain regulatory requirements are being met. Thermal-hydraulic performance could be demonstrated by comparing simulator performance to actual plant performance during startup, power ascension, normal operation, and transient response. Startup test procedures and licensee event reports are good data sources.

30. Core performance testing: is it acceptable to do "off-line" testing of core performance (i.e., not use the actual simulator but instead a stand-alone system)?

The ANSI/ANS-3.5-1998 standard, in Section 3.1.3, requires that the evolutions, such as core performance testing, be supported by the simulator, using only operator action normal to the reference unit. There is nothing to preclude testing off-line for the sake of designing, debugging, and testing without other system interfaces to assure that the model is ready to be integrated into the simulated plant. However, fully integrated core performance testing on the plant-referenced simulator is necessary to ensure that the appropriate input and output from and to other models are sufficient in scope and fidelity to ensure that the simulator responds as the plant would under the same conditions.

31. Updating models: is it encouraged to update our reactor vessel/core models to comply with 10 CFR 55.46?

The Commission in its statements of consideration during the rule making, emphasized that facility licensee's would not be required to update their core models in order to comply with the requirements of 55.46. Refer to Regulatory Guide 1.149, Revision 3. This assumes that the simulator core model has been performance tested and the test results meet the appropriate acceptance criteria when compared to the reference plant performance or best estimate performance where actual performance data is not available.

32. Inspector's simulator inspection training document: would you make this available to the USUG?

IP-71111.11 Simulator Fidelity Inspection Guidance for Sections 2.11, 3.11, and Appendix C, was provided to the USUG as an enclosure to the summary of the August 2003 meeting between the NRC and the Mid-Atlantic Nuclear Training Group (ML040830603). Bear in mind that the enclosure is not intended to replace IP-71111.11 but to provide guidance to inspectors who are responsible for conducting this part of the inspection for the first time.

33. Certification Requirements: it's been hinted that the NRC may have to revisit the removal of the old simulator certification requirement. Is this the case?

A revisit of the old simulator certification (i.e., old NRC Form-474) would only be prompted if the current rule is found to be inadequate to ensure continued assurance of simulator fidelity. As more and more simulator inspections are conducted, the staff will be able to better evaluate the need for simulator certifications. This does not appear to be the case at the present time. The rule is quite robust in ensuring simulator fidelity.

34. IP-71111.11 Appendix C: it doesn't appear that there's anything I can do to prepare for this inspection. Would you agree?

On the contrary, the facility licensee should be cognizant of the ANS-3.5 standards and the IP-71111.11 areas that the inspector will look at.

35. Core Performance Testing (statement, not a question): MANTG is working on a core performance testing position paper. This will be shared with USUG when completed.

No comment other than it is a good initiative!

36. Scenario-based Testing: what additional documentation beyond a checklist would be required to validate the testing?

See Question #6 and #24.

Operator Licensing Program Feedback

10 CFR 55
Questions related to the operator licensing regulations

1. How long does it take for an exemption request to be received and to be answered?

The time required will depend on the nature of the request and the quality of the licensee's submittal. Plan at least two months to get an answer. If the NRC requires additional information to make a decision, it will probably take longer.

Operator Licensing Program Feedback

General;
Questions that do not fit another category

1. Is there some way to do a better distribution of clarifications/rulings from one site in the region to another? This would help all of us meet your expectations.

One of the NRC's goals in establishing this web site is to improve communications with facility licensees and to enhance consistency.

2. Will there be a revision to NUREG-1262 at any time soon? NUREG-1262 contains information that conflicts with NUREG-1021. Is there any intent to make NUREG-1262 current?

No. The NRC does not plan to revise NUREG-1262, "Answers to Questions at Public Meetings Regarding Implementation of Title 10, Code of Federal Regulations, Part 55 on Operators' Licenses," which was published in November 1987. At the NRC staff's request, the Nuclear Energy Institute provided a list of questions and answers that appear to be out-of-date, but revising the NUREG remains a low priority. If there are conflicts between NUREG-1262 and any other guidance issued since then (including NUREG-1021 and the answers to these questions), the more recent guidance would take precedence.

3. Has the question been asked about the "intellectual rights" of the examination work product owner versus publish of examinations?

Examination authors are not prohibited from copyrighting their work. However, the NRC can not accept copyrighted materials unless the holder of the copyright signs a release form to allow its publication. When those materials are placed in the public document room, users are permitted to make one copy for personal use. If additional copies are required, the user will have to obtain permission from the copyright holder.

4. Is the ES-601 definition of "low power" serious?

Low power - Is it really criticality to 5%?

Low power scenarios are defined as criticality to 5% reactor power. Is this the expectation to receive credit for a low power scenario?

Yes. The NRC staff's evaluation of shutdown and low-power operations at commercial nuclear power plants, which was reported in NUREG-1449, included operations with the reactor in the subcritical (i.e., shutdown) state and in transition between subcriticality and 5 percent power (i.e., low power). When NUREG-1021 was revised to place more emphasis on those operating conditions, it made more sense to use the same definition than to develop a new one. The definition, which has been incorporated in Appendix F of NUREG-1021, applies to both the initial and requalification examinations.

The NRC intends for the operating tests to sample the full range of operating conditions and power levels so they do not become predictable. It is unlikely that the NRC would deny credit

for a scenario simply because it exceeded the power limit specified in a somewhat arbitrary definition.

5. What is/where do I find my "Commission Approved" training program?

As noted in the Statements of Consideration for the 1987 amendment to 10 CFR 55, a facility licensee's training program is considered Commission-approved when it becomes accredited by the National Nuclear Accrediting Board.

6. How familiar are, and what kind of training have the examiners received on the SAT process? How familiar (knowledgeable) are the headquarters management on the SAT process? What kind of training have they received?

The staff of the NRC Operator Licensing Program Office includes training and assessment specialists who are well-versed on SAT-based training processes and have many years of combined training experience. Issues and questions that come up regarding SAT-based training requirements and expectations are referred to one or more of those specialists for resolution. NRC examiners and managers having responsibilities in this area have received instruction on the SAT process during periodic operator licensing examiner training and conferences.

7. I would like to see the NRC go more toward an inspection process for plants that volunteer to write the exams. Have only one NRC examiner involved, allow the utility to administer all parts of the exam and use the resident if more oversight is needed during the exam administration. The NRC should continue to make the final licensing decision.

Comment noted. Although the NRC favors reducing unnecessary regulatory burden, the examination policies will only be changed if the NRC concludes that the changes will not have a negative impact on reactor safety, public confidence, efficiency and effectiveness. At the present time, the NRC sees significant benefit in continuing its current level of involvement in the operator licensing process.

8. NRC needs to understand that increased difficulty of exam process is a negative motivator and could be a distraction to competent board operators. Recommend survey to understand scope and potential impact on safe plant operations.

The examination process seems to be getting harder as compared to a few years ago.

Exam difficulty has gone beyond reason and is impacting the requal program. People are not willing to put up with the hassle and it does not result in better operators. It is impossible to meet question standards and avoid "tricky" questions, very knowledgeable operators can appear less that competent based on complexity of question rather than a test of knowledge.

As reported in Attachment 1 (Section 1) of SECY-98-266, the NRC has also noted a slight decrease in the average passing rates on both the written and operating portions of the facility-prepared examinations when compared with the passing rates on NRC-prepared examinations. However, the decrease could be caused by a number of factors including

variations in the average level of experience of the license applicants, changes in the quality of the training or the facility licensee's threshold for screening its applicants before they take the licensing examination, or variations in the average level of difficulty of the examinations. Although the staff did not intend for the level of difficulty or the failure rate on the examinations to increase, the examiners' efforts to achieve NRC standards regarding the cognitive level of questions and to improve the plausibility of the distractors may have improved the discrimination validity of the examinations. Consequently, those applicants who may have passed an examination containing lower cognitive level questions on which some of the distractors could be eliminated as implausible are now having more difficulty selecting the correct answers; in essence, their chances of passing the examination by guessing some of the correct answers have diminished. Considering the historical fluctuation in the average examination passing rates and the other factors that could be responsible for some or all of the observed decline, the NRC has concluded that any increase in the level of difficulty is not significant.

The Operator Licensing Program Office will continue to monitor the applicants' performance for indications that the examinations are becoming too difficult. The initial operator licensing examination performance trends since 1991 are available for review on the Operator Licensing Process page.

9. The most common issue raised by Hot License Candidates and Requal license holders surround the issue of "trick questions" and operator written exams not being a fair test of operator knowledge.

The NRC exam has become an exercise in exam taking skills instead of a knowledge assessment.

The NRC goes to considerable lengths to ensure that its examinations measure what they are intended to measure, thereby enabling the NRC to distinguish between applicants who have and have not mastered the knowledge and abilities required to be safe nuclear power plant operators. The principles of fairness, validity, and safety have guided the NRC throughout the process of developing and implementing NUREG-1021. As stated in Attachment 1 of Appendix B of NUREG-1021, the NRC strives to minimize unnecessary difficulty, trickiness, and irrelevancy in its written examination questions. Authors and (multiple) reviewers are expected to identify and correct these psychometric deficiencies. Moreover, Section E.4 of ES-401 encourages facility licensees to peer-validate the written examination in a final effort to identify and correct deficiencies that might affect the validity of the examination.

Although the NRC has increased its emphasis on higher cognitive level questions and the plausibility of distractors in an effort to enhance the discrimination validity of the examinations, some may have misinterpreted these actions as an effort to trick or fool otherwise knowledgeable applicants. Truly knowledgeable applicants should be able to pass the examination regardless of their test-taking skills. Applicants who rely too much on their test-taking skills or their ability to guess the right answer after eliminating the implausible distractors should not be able to pass the licensing examination.

Operator Licensing Program Feedback

10. Guidelines shouldn't be open for individual examiner interpretation if it could show up as a weakness in the exam report. Example: Amount of question/operating test overlap on the requal exam from week to week.

There are still regional "requirements" (not NUREG interpretations) outside of NUREG-1021 such as ROI's [regional office interactions], etc. for example: "one scenario must have a computer failure." Why are these things still out there? Shouldn't they be in 1021 if they are required?

What is the NRC doing to ensure that the examiners are working to the same standards?
Comments noted.

The NRC's existing measures to maintain consistency in the examination process were summarized in Attachment 1 to SECY-98-266, "Final Rule - Requirements for Initial Operator Licensing Examinations." NRC examiners are expected to comply with the guidelines in NUREG-1021 and to exercise good judgment in those areas requiring a subjective evaluation. The reviews and audits conducted by NRC regional management and the operator licensing program office and the continuing training program for examiners help minimize individual examiner interpretations and ensure consistency.

Section B of ES-201 requires the NRC Regional Offices to obtain approval from the operator licensing program office prior to knowingly deviating from the intent of the NUREG or implementing any initiative that has the potential to undermine examination consistency.

11. Need region workshops to calibrate us on future JPM direction.

We may want to have an exam writing workshop.

Who would be interested in putting together a utility sponsored exam question writing seminar?

Suggest national NUREG-1021 workshop twice a year with focus on facilities with upcoming exams (within 6-12 months).

The NRC has sponsored and participated in a number of examination workshops and, to the extent possible, will continue to work with facility licensees and industry training groups in this area. The NRC encourages facility licensees to pool their resources and work together to develop their examination-writing skills. The regional training organizations, Nuclear Energy Institute (NEI), and Institute of Nuclear Power Operations (INPO) might be able to provide support in this area.

Suggestion noted.

Operator Licensing Program Feedback

12. Will you "endorse" the Sonalyst Workshop?

The NRC reviewed the Sonalyst Workshop to ensure that it was consistent with NUREG-1021. Legally, the NRC can not endorse specific vendors or programs provided by them.

13. Install a bulletin board on the NRC web page for lessons learned as discussed in the workshop.

Suggestion noted. The operator licensing program office plans to use the Regulations, Guidance, and Communications page of its web site to promulgate lessons learned, guidance, policy clarifications, and interpretations that arise between revisions of NUREG-1021.

14. Can we get a copy of the two year NRC examining schedule?

The examination and inspection schedule (covering at least the next year) is posted on this web site. We expect to update the schedule at least quarterly.

15. Why did the NRC, INPO [Institute of Nuclear Power Operations], and NEI [Nuclear Energy Institute] meet [on December 16, 1999] to discuss future options for the exam process without involving industry representatives in the process?

The NRC issued a meeting notice on December 7, 1999, and members of the public and nuclear industry were welcome to attend. The NRC assumed that NEI would follow up with the appropriate operator licensing task force representatives as it had for previous meetings.

16. How will PRA [probabilistic risk assessment] need to be identified in future exams?

Section D.1.f of ES-301 requires examination authors to consider PRA insights (e.g., dominant accident sequences and risk-important operator actions) when preparing the operating tests. The Examination Outline Quality Checklist (Form ES-201-2) requires NRC examiners to assess whether plant specific priorities (including PRA and IPE insights) are covered in the appropriate exam section. Although there is currently no requirement to identify which test items address the PRA insights, the examination author should be able to explain to the chief examiner how those insights were covered. The NRC has no immediate plans to change this requirement.

17. How do we stabilize this process so that it won't have a detrimental effect on industry staffing needs? (Taking into account the huge demands that will be necessary due to the aging workforce.)

Many of the changes that have recently been made in the examination process can be directly attributed to industry requests. The NRC will continue to be responsive to its industry stakeholders as long the agency's goals related to safety, public confidence, efficiency, and effectiveness are not compromised. In that regard, the operator licensing program office will continue to work with the NEI operator licensing focus group in an effort to identify those changes that are in the best interest of the industry and the public.